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Expedition to the tropical  
Pacific, from August, 1899 to  
March, 1900.

13. The Shore Fishes:

[by] W.C. Kendall [and]  
E.L. Goldsborough

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Memoirs of the Museum of Comparative Zoölogy  
AT HARVARD COLLEGE.  
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REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE  
TROPICAL PACIFIC, IN CHARGE OF ALEXANDER AGASSIZ, BY THE  
U. S. FISH COMMISSION STEAMER "ALBATROSS," FROM AUGUST, 1899,  
to MARCH, 1900, COMMANDER JEFFERSON F. MOSER, U. S. N., COM-  
MANDING.

XIII.

THE SHORE FISHES.

By WILLIAM C. KENDALL AND EDMUND L. GOLDSBOROUGH.

WITH SEVEN PLATES.

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FEBRUARY, 1911.  
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## TROPICAL PACIFIC.

*The following Publications of the Museum contain Reports on the Dredging Operations in charge of Alexander Agassiz, of the U. S. Fish Commission Steamer "Albatross," during 1899 and 1900, Commander Jefferson F. Moser, U. S. N., Commanding.*

- I. A. AGASSIZ. Preliminary Report and List of Stations. With Remarks on the Deep-Sea Deposits by Sir John Murray. Mem. M. C. Z., Vol. XXVI. No. 1. January, 1902. 114 pp. 21 Charts.
- II. A. G. MAYER. Some Species of Partula from Tahiti. A Study in Variation. Mem. M. C. Z., Vol. XXVI. No. 2. January, 1902. 22 pp. 1 Plate.
- III. A. AGASSIZ and A. G. MAYER. Medusæ. Mem. M. C. Z., Vol. XXVI. No. 3. January, 1902. 40 pp. 13 Plates, 1 Chart.
- IV. A. AGASSIZ. The Coral Reefs of the Tropical Pacific. Mem. M. C. Z., Vol. XXVIII. February, 1903. 33, 410 pp. 238 Plates.
- V. C. R. EASTMAN. Sharks' Teeth and Cetacean Bones from the Red Clay of the Tropical Pacific. Mem. M. C. Z., Vol. XXVI. No. 4. June, 1903. 16 pp. 3 Plates.
- VI. W. E. HOYLE. Cephalopoda. Bull. M. C. Z., Vol. XLIII. No. 1. March, 1904. 72 pp. 12 Plates.
- VII. H. LUDWIG. Asteroidea. Mem. M. C. Z., Vol. XXXII. July, 1905. 12, 292 pp. 35 Plates, 1 Chart.
- VIII. W. E. RITTER and EDITH S. BYXBEE. The Pelagic Tunicata. Mem. M. C. Z., Vol. XXVI. No. 5. August, 1905. 22 pp. 2 Plates.
- IX. MARY J. RATHBUN. The Brachyura. Mem. M. C. Z., Vol. XXXV. No. 2. August, 1907. 54 pp. 9 Plates.
- X. C. H. GILBERT. The Lantern Fishes. Mem. M. C. Z., Vol. XXVI. No. 6. July, 1908. 24 pp. 6 Plates.
- XI. A. AGASSIZ. Echini. The Genus Colobocentrotus. Mem. M. C. Z., Vol. XXXIX. No. 1. November, 1908. 44 pp. 49 Plates.
- XII. J. MURRAY and G. V. LEE. The Depth and Marine Deposits of the Pacific. Mem. M. C. Z., Vol. XXXVIII, No. 1. June, 1909. 170 pp. 5 Plates. 3 Maps.
- XIII. W. C. KENDALL and E. L. GOLDSBOROUGH. The Shore Fishes. Mem. M. C. Z., Vol. XXVI. No. 7. February, 1911. 106 pp. 7 Plates.



**Memoirs of the Museum of Comparative Zoölogy**

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PRESERVATION MASTER  
AT HARVARD

REPORTS ON THE SCIENTIFIC RESULTS OF THE EXPEDITION TO THE TROPICAL  
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STEAMER "ALBATROSS," FROM AUGUST, 1899, TO MARCH, 1900, COMMANDER  
JEFFERSON F. MOSER, U. S. N., COMMANDING.

XIII.

THE SHORE FISHES.

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INTRODUCTION.

The following report is based upon a collection of shore fishes and a few surface pelagic fishes made during the expedition of the U. S. Fish Commission Steamer "Albatross" in 1899 and 1900 under the direction of the late Dr. Alexander Agassiz.

The places visited are the Marquesas, Paumotu, Society, Cook, Friendly, Tonga, Fiji, Ellisee, Gilbert, Ratak, Marshall, Caroline, and Ladrone Islands (Guam), descriptions of which appear in Mr. Agassiz's Coral Reefs of the Pacific (Memoirs M. C. Z. **28**, 1903). There is also an account of the native fisheries in Mr. A. B. Alexander's Notes on the Boats, Apparatus, and Fishing Methods employed by the natives of the South Sea Islands and results of fishing trials by the Albatross (Report U. S. F. C. for 1901, 1902, p. 741-829).

Some of the localities yielded many more species than others but this is doubtless due mainly to more extensive collecting in those places.

While the collection is not a large one, upon the whole, when the unfavorable conditions and poor facilities for collecting among the coral islands are considered, a remarkably large number of species was obtained. Many of them, however, are represented in the collections only by young or immature fishes difficult of identification.

In the present paper fifty-three families and two hundred and thirty-one species are represented, of which eight species and one genus, *Paragobioides*, are new.

The new species are *Kuhlia proxima*, *Lutianus marginatoides*, *Therapon maculatus*, *Dascyllus pomacentroides*, *Ruppiella lacunicola*, *Paragobioides grandoculis*, *Petroscirtes quadrimaculatus*, and *Canthigaster constellatus*.

The table (p. 338-343) shows the distribution of the species among the groups as indicated by the collection.

The Friendly Islands, owing to their proximity to the Tonga Group, have been included with the latter.

The plates were made from drawings by Miss Violet Dandridge.

Specimens representing 143 species contained in this collection have been sent to the Museum of Comparative Zoölogy, others including the types of the new species to the U. S. National Museum.

#### ANNOTATED LIST OF THE SPECIES.

##### CARCHARIDÆ.

###### *Carcharias melanopterus* QUOY & GAIMARD.

Voy. Uranie. Zool., 1824, p. 194, pl. 43, fig. 1, 2. JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1905, **23**, pt. 1, p. 38, pl. 1.

No. A50, skin of a specimen 36 inches long from Fakarava, Paumotu Islands.

##### ALBULIDÆ.

###### *Albula vulpes* (LINNÉ).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 55, fig. 9.

*Esor vulpes* LINNÉ, Syst. Nat. ed. 10, 1758, p. 313.

*Albula glossodon* GÜNTHER, Fische der Südsee, 1909, **8**, p. 385.

Three specimens, No. 08836, 2 $\frac{3}{4}$  to 3 inches long from Funafuti, Ellice Islands. M. C. Z. 29467 (1 specimen).

**CHANIDAE.****Chanos chanos** (FORSKÅL).

JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1905, **23**, pt. 1, p. 56, fig. 10. GÜNTHER, Fische der Südsee, 1909, **8**, p. 387.

*Mugil chanos* FORSKÅL, Descript. Anim., 1775, p. 74.

The collection contains the following specimens from the Paumotu Islands, Nos. 05833, 05834, and 05835, M. C. Z. 29772, each 7 inches long, from Makemo, and 05831, M. C. Z. 29771, and 05832, each 7 inches long, from Niau.

**CLUPEIDAE.****Stolephorus delicatulus** (BENNETT).

*Clupea delicatula* BENNETT, Proc. Comm. Zool. Soc. Lond., 1831, p. 168.

*Spratelloides delicatulus* BLEEKER, Atlas Ichth., 1866-72, **6**, p. 89, 96, tab. 264, Clup., 6, fig. 3.

No. 09023, fifteen specimens  $\frac{7}{8}$  to  $2\frac{3}{16}$  inches long, and three specimens, No. 09028, M. C. Z. 29520,  $1\frac{1}{2}$  to  $1\frac{1}{4}$  inches long, all from Taritari, Gilbert Islands; No. 09062, forty-nine specimens  $1\frac{3}{16}$  to  $1\frac{13}{16}$  inches long from Arhno, Marshall Islands, and two specimens, No. 09007, small and mutilated, from Rangiroa, Paumotu Islands.

**Harengula kunzei** BLEEKER.

Nat. Tijds. Ned. Ind., 1856, **12**, p. 209.

*Clupea (Harengula) kunzei* BLEEKER, Atlas Ichth., 1866-72, **6**, p. 89, 91, 100, 107, tab. 263, Clup. tab. 5, fig. 1.

*Clupea kunzii* GÜNTHER, Fische der Südsee, 1909, **8**, p. 382.

Two specimens, No. 08931 and 09000,  $2\frac{3}{4}$  and  $4\frac{1}{4}$  inches long from Jaluit, Marshall Islands, and eighty-six specimens, Nos. 05791-92, M. C. Z. 29459 (14 specimens) and 09006 (young)  $1\frac{1}{4}$  to 2 inches long, all from Suva, Fiji Islands.

**Harengula sundaica** BLEEKER.

*Clupea (Harengula) sundaica* BLEEKER, Atlas Ichth., 1866-72, **6**, p. 89, 99, 105, tab. 261, Clup. 13, fig. 5.

Thirty-two specimens, No. 05794,  $1\frac{1}{2}$  to 3 inches long, from Nukuhiva, Marquesas Islands. M. C. Z. 29507 (7 specimens).

**Harengula commersoni** (Cuvier & Valenciennes).

*Clupeonina commersoni* Cuv. & Val., Hist. Nat. Poiss., 1847, **20**, p. 350.

*Alausa melanura* Cuv. & Val., Hist. Nat. Poiss., 1847, **20**, p. 324.

*Clupea (Harangula) melanurus* Bleeker, Atlas Ichth., 1866-72, **6**, p. 89, 100, 111.

*Clupea (Paralosa) melanurus*, tab. 269, Clup. 11, fig. 5.

*Clupea atricauda* Günther, Fische der Südsee, 1909, **8**, p. 381.

Two specimens, Nos. 05788-9, M. C. Z. 29386, each  $4\frac{1}{2}$  inches long, from Vavau, Tonga Islands. One specimen, No. 05793,  $3\frac{4}{5}$  inches, Papeete, Tahiti, Society Islands; six specimens, Nos. 08817-19, 08825, 08887-8,  $4\frac{1}{2}$  to  $5\frac{1}{2}$  inches long from Suva, Fiji Islands.

**SYNODONTIDAE.****Saurida gracilis** (Quoy & Gaimard).

Günther, Fische der Südsee, 1909, **8**, p. 376.

*Saurida gracilis* Quoy & Gaimard, Voy. Uranie, Zool., 1824, p. 224.

One specimen, No. 09005,  $6\frac{1}{2}$  inches long, from Makemo, Paumotu Islands. Three specimens, No. 08907, M. C. Z. 29525,  $1\frac{1}{4}$ - $2\frac{1}{4}$  inches long, Truk Group, Caroline Islands.

**ANGUILLIDAE.****Anguilla mauritiana** Bennett.

Proc. Comm. Zool. Soc. Lond., 1831, p. 128. Jordan & Seale, Bull. U. S. Bur. Fish., 1906, **25**, p. 192.

No. A196, M. C. Z. 29737, 27 inches, and No. A197, 32 inches long from Kusaie, Caroline Islands.

**Anguilla otaheitensis** Kaup.

Neue Aalähnliche Fische des Hamburger Mus., 1859, p. 17, tab. 2, fig. 2.

*Anguilla anietensis* Günther, Chall. Rept., 1880, p. 58.

We have the following specimens from Papeete, Tahiti, Society Islands:

No. A33, a specimen  $17\frac{1}{4}$  inches long. Vomerine teeth extending almost or quite as far back as the maxillary teeth; gape about 3 in head, extending past posterior border of eye; dorsal beginning about an inch in front of vent.

No. A32, a specimen  $18\frac{1}{2}$  inches long. Vomerine teeth extending nearly as far back as maxillary teeth; gape about 3 in head and extending past posterior border of eye; dorsal beginning about  $\frac{3}{8}$  inch in front of vent.

No. A34, M. C. Z. 29752, a specimen 15 inches long. Vomerine teeth not extending back quite so far as maxillary teeth; gape extending but a little beyond posterior border of eye, about 3 in head; dorsal beginning about  $\frac{11}{16}$  inch in front of vent.

A specimen, no tag or locality,  $20\frac{3}{4}$  inches long. Vomerine teeth not extending so far back as maxillary; gape about 3 in head extending back considerably farther than eye; dorsal begins  $1\frac{5}{16}$  inches in front of vent.

Jordan & Seale (Bull. U. S. Bur. Fish., 25, p. 192), place *Anguilla aneitensis* Günther (Chall. Rept. p. 58), as a synonym of *A. megastoma*. We cannot see upon what grounds this is done, as all that Günther says about it is that it was a malformed specimen from a river near Lake Waihirra.

Three of our specimens come from the type locality of *A. otaheitensis* and they are undoubtedly that species. There is some variation in the relative position of the origin of the dorsal and the relative extent of the vomerine teeth, which suggests that these characters are not of much specific value. The other specimen shows no tangible differences, and there is a possibility that they all belong to some earlier described species.

#### MYRIDAE.

##### *Muraenichthys macropterus* BLEEKER.

Act. Soc. Sci. Indo-Nederl., 1864, 4, p. 11, Amboina 8, p. 91. Atlas Ichth., 1864, 4, p. 31, tab. 151, Mur. 7, fig. 3.

Six specimens, No. 09966,  $2\frac{1}{8}$  to  $4\frac{7}{16}$  inches long from Arhno Atoll, Marshall Islands. M. C. Z. 29500 (2 specimens).

##### *Muraenichthys schultzei* BLEEKER.

Nat. Tijds. Ned. Ind., 1857, 13, p. 366. Atlas Ichth., 1864, 4, p. 31, 33, tab. 148, Mur. 4, fig. 3.

Three specimens,  $2\frac{3}{4}$  to 3 inches long from Funafuti, Ellice Islands. M. C. Z. 29594 (1 specimen).

In dental characters our specimens agree with Bleeker's description but the origin of the dorsal, so far as can be discerned, seems to be situated more posteriorly, more like *M. gymnotus*.

#### OPHICHTHYIDAE.

##### *Leiuranus semicinctus* (LAY & BENNETT).

*Ophisurus semicinctus* LAY & BENNETT, Zool. Beechey's Voyage, 1839, p. 66, pl. 20, fig. 4.

*Leiuranus colubrinus* BLEEKER, Atlas Ichth., 1864, 4, p. 42, tab. 163, Mur. 19, fig. 1.

One specimen, No. 09063, 6 inches long from Arhno Atoll, Marshall Islands.

#### MURAENIDAE.

##### *Gymnothorax richardsonii* BLEEKER.

Atlas Ichth., 1864, 4, p. 85, 100, tab. 186, Mur. tab. 42, fig. 2.

*Muraena richardsonii* BLEEKER, Nat. Tijds. Ned. Ind., 1852, 3, p. 296.

Two specimens, No. 05783, 05784, M. C. Z. 29792 (small), Bora Bora, Society Islands.

##### *Gymnothorax pictus* (AHL).

*Muraena picta* AHL, Specimen Ichthyologicum de Muraena et Ophichtho, 1789, p. 8, pl. 2, fig. 2.

The collection contains the following specimens from Paumotu Islands: No. 08822, 14½ inches long from Anaa. No. A52, M. C. Z. 29760 16¾ inches long from Fakarava; No. 05771, 13½ inches long, No. 05770, 13½ inches long, and No. 05772, M. C. Z. 29761, 14½ inches long, from Makemo. No. A36, 20½ inches long from Tikei. No. A20, 23 inches long from Rangiroa. Another specimen, No. A156, 18 inches long from Funafuti, Ellice Islands, and Nos. 09044, 6 inches long and 09043, 9½ inches long from Jaluit, Marshall Islands.

The following notes were taken from the above specimens:

Color of No. 08822, in alcohol, creamy white, thickly speckled with brown on back and sides, belly plain white, specks arranged in irregular, crowded groups, same color on dorsal fin; this grouping on the white background gives a faint reticulated effect, the reticulations being of the pale color; anal white;



dots on the head not extending forward beyond posterior edge of eye, or below upper jaw, though on one side there are two or three dots in front of eye.

Color of Nos. 09043-4, in alcohol, ground color yellowish, probably gray in life; dorsal, back and sides with small irregular brownish rings and broken rings and irregular groups of coalescing spots; spots on lower side of abdomen distinct, not coalescing; belly unspotted, top and side of head with small distinct spots, extending to end of snout, but none on jaws, or under lower jaw.

No. A156, M. C. Z. 29759. This specimen is very thickly speckled with small purplish brown specks, which sometimes coalesce into larger spots; lower jaw and throat with numerous small spots and specks; belly plain.

No. A52. Color similar to A156, but with fewer specks on lower jaw and throat.

No. 05771. Color similar to that of A52.

No. 05770. Color similar to No. 05771, in addition, however, it has a few small spots on belly; spots on throat and lower jaw are a little larger and more scattering.

No. A36. Very thickly spotted with larger spots than the last, amongst which the ground color makes a fine reticulated effect; throat and lower jaw thickly spotted with comparatively large spots.

No. A20. Color cannot be clearly made out, seemed to be finely speckled; lower jaw has scattering small spots, none on throat.

No. 05772. Color badly faded, seemed to have had fewer spots, which were more coalescing into rings and groups; throat not spotted; lower jaw with very few small specks.

#### ***Gymnothorax rupelliae* (McCLELLAND).**

*Dalophis rupelliae* McCLELLAND, Calcutta Journ. Nat. Hist., 1845, 5, p. 213.

*Gymnothorax reticularis* BLEEKER, Atlas Ichth., 1864, 4, p. 85, 98, tab. 177, Mur. 33, fig. 1, and tab. 183, Mur. 39, fig. 2; tab. 181, Mur. 37, fig. 4 (not of Bloch).

One specimen, No. 05786 (small), Rangiroa, Paumotu Islands.

#### ***Gymnothorax tessellatus* (RICHARDSON).**

BLEEKER, Atlas Ichth., 1864, 4, p. 85, 93, tab. 171, Mur. 27, fig. 3.

*Muraena tessellatus* RICHARDSON, Zool. Voy. Sulphur. Ichth., 1845, p. 109, pl. 55, fig. 5-8.

One specimen, No. 05785,  $3\frac{3}{4}$  inches long from Rangiroa, Paumotu Islands.

**Gymnothorax stellatus** (LACÉPÈDE).

*Muraenophis stellatus* LACÉPÈDE, Hist. Nat. Poiss., 1803, **5**, p. 622, 629, 644.

*Muraena fimbriata* BENNETT, Proc. Comm. Zool. Soc. Lond., 1831, p. 168. DAY, Fishes of India, 1878, p. 670, pl. 172, fig. 1.

No. 05775, a specimen  $7\frac{3}{4}$  inches long, and 05782, M. C. Z. 29580,  $3\frac{3}{4}$  inches long, from Fakarava, Paumotu Islands.

**Echidna tritor** VAILLANT & SAUVAGE.

Rev. et Mag. Zool., 1875, **3**, p. 287.

*Echidna leihala* JENKINS, Bull. U. S. Fish Comm., 1903, **22**, p. 428, fig. 9. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 203.

No. 05773, a specimen  $9\frac{1}{2}$  inches long and 05774, M. C. Z. 29579,  $5\frac{1}{2}$  inches long, from Fakarava, Paumotu Islands. In the position of the vent, which is nearer the tip of snout than the tip of tail, these specimens agree with *E. psalion*.

**Enchelynassa canina** (QUOY & GAIMARD).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 197.

*Muraena canina* QUOY & GAIMARD, Voy. Uranie, Zool., 1824, p. 247.

No. A51,  $18\frac{1}{2}$  inches long from Fakarava, Paumotu Islands.

**Uropterygius pantherinus** (LESSON).

*Ichthyophis pantherinus* LESSON, Voy. Coquille, Zool. Poiss., 1830, **2**, p. 131, Atlas, pl. 13.

*Gymnomuraena pantherina* BLEEKER, Atlas Ichth., 1864, **4**, p. 112, 113, tab. 175, Mur. 31, fig. 3.

Number A49, a specimen  $23\frac{1}{2}$  inches long from Fakarava, Paumotu.

Sharp curved teeth in both jaws in several irregular rows that are hard to count; at least four rows anteriorly, bunched in front of vomer and at the junction of upper jaw; vomer with two rows of teeth anteriorly, single row posteriorly, those in front curved backward, the posterior three curved forward. No vestige of fin except at extremity of tail.

This specimen is very certainly identifiable with *Gymnothorax pantherina* in Bleeker's Atlas. Bleeker states that his specimens are quite certainly the same as Lesson's *Ichthyophis pantherinus*, and suggests the possibility of its being the *Gymnomuraena marmorata* Lacépède. It is, however, quite as certain

that our specimens, as well as Bleeker's, are not *Gymnothorax marmorata*, if those recorded from the Hawaiian Islands by Jordan & Evermann, and those from Samoa by Jordan & Seale, are correctly identified.

While Lesson's *Ichthyophis pantherinus* has been included in the synonymy of *Uropterygius marmorata*,<sup>1</sup> it has not the same character of vertical fins on the tail, in fact it has practically none, while *U. marmorata* from Hawaii has the vertical fins extending a short distance on the tail both above and below. There is nothing in Lesson's description to show the number of the rows of teeth or whether the posterior nostril was tubular or not. In fact no posterior nostril is shown in the figure, but the color, shape, and character of the tail, are much like those of our specimens, which have the posterior nostril tubular. We therefore retain Lesson's specific name and place it in *Uropterygius*.<sup>2</sup>

<sup>1</sup> *Uropterygius marmorata* in Fishes of Hawaiian Islands, Jordan & Evermann, is incorrectly illustrated by a figure of *Callichelys marmorata* copied from tab. 155, Mur. 11, fig. 2 of Bleeker's Atlas. Probably *Gymnomuraena macropterus*, p. 113, 115, and *G. xanthopterus*, p. 112, 114 and tab. 164, Mur. 20, figs. 2 and 4 of Bleeker's Atlas and possibly *G. macrocephalus*, p. 112, and 114, tab. 166, Mur. 21, fig. 2, are correctly included in the synonymy of *U. marmorata*.

<sup>2</sup> In Fishes of Hawaiian Islands Jordan & Evermann place the genus *Ichthyophis* Lesson in the synonymy of *Uropterygius* as follows: "Ichthyophis Lesson, Voy. de la Coquille, 1829, 2, p. 131, (*pantherinus* = *marmoratus*); not of Fitzinger 1829 (1826) a genus of reptiles."

Also in their synonymy of *Uropterygius marmoratus* occurs:—*Ichthyophis pantherinus* Lesson, Voy. Coquille. Zool. Poiss., 1829, 2, p. 131.

In the Proceedings of the U. S. Nat. Mus. 1901, 23, p. 886, Jordan & Snyder establish the genus *Scuticaria*, retaining as type of the genus *Ichthyophis tigrinus* Lesson, having the posterior as well as the anterior nostril tubular.

In Fishes of Hawaiian Islands, (Bull. U. S. Fish Comm. 1905, 23, pt. 1, p. 112) Jordan & Evermann in the synonymy of *Scuticaria* have:—"*Muraenobleps* Kaup, Cat. Apod. Fish., 97, 1856 (*tigrina*); not of Lacépède, 1803, which is a *Myrine*." In the same work (p. 113) in the synonymy of *Scuticaria tigrina*, they include "*Ichthyophis tigrinus* Lesson, Mem. Soc. Hist. Nat. Paris, IV, 399, 1829." Rüppell shows, in the figure of *Uropterygius concolor*, a short tube at posterior nostril, and says in the description of this species:—"Nasenlöcher wie gewöhnlich bei den Muraenen mit Kurzen Hautfühlern versehen." This does not necessarily exclude posterior nostrils.

Jordan & Evermann in the description of *U. marmorata*, state that the anterior nostrils are in short tubes and the posterior have elevated rims. A specimen of theirs, from the Hawaiian Islands, shows the posterior tube as long as the anterior. Specimens in the U. S. Nat. Mus. from the same locality and labeled *Uropterygius marmorata*, that are 5 to 6 inches long, show, in the smaller examples, no rim, and in the larger, a very slight rim at posterior nostril.

These resemble specimens of the same size from Samoa, labeled *Uropterygius concolor*, all of which are exactly like specimens in our collection which we have identified as young *U. marmorata*. Larger specimens from Samoa labeled "*Scuticaria marmorata*," show posterior nostril tubes as they are in a specimen of *Scuticaria tigrinus* of the same size from Hawaii.

It thus seems that the presence or absence of posterior nasal tubes affords no basis for separating the genera on this character, and the genus *Scuticaria* will have to be dropped in favor of *Uropterygius*.

The type of *Ichthyophis* is *tigrinus* and not *pantherinus* (Lesson, Mem. Soc. Hist. Nat. Paris, 1828, 4, p. 100).

***Uropterygius marmoratus* (LACÉPÈDE).**

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 111, fig. 33.

*Gymnomuraena marmorata* LACÉPÈDE, Hist. Nat. Poiss., 1803, **5**, p. 648.

We have the following specimens from Paumotu Islands:—

Nos. A54, 05776, 05777, M. C. Z. 29581, 4 to 9½ inches long from Fakarava, and 05787, two small specimens from Makemo, M. C. Z. 29471.

In No. A54 the color in alcohol is dark olive-green, thickly marbled with darker; fins at the end of the tail not noticeably lighter.

In the smaller (young) examples, in which we can detect no other tangible differences, the color is uniform purplish brown without evident marbling, fins at the tail yellowish white.

*U. marmoratus* and *concolor* are very probably the same species. In very young individuals we can find no differences except a slight difference in color and these do not show in alcoholic specimens.

***Uropterygius concolor* RÜPPEL.**

Neue Wirb. Fische, 1835, p. 83, taf. 20, fig. 4.

Two specimens, No. 09009, 1½ and 2½ inches long from Rangiroa, Paumotu Islands. M. C. Z. 29475 (1 specimen).

**BELONIDAE.*****Belone platyura* BENNETT.**

Proc. Comm. Zool. Soc. London, 1830, p. 168. GÜNTHER, Fische der Südsee, 1909, **8**, p. 349.

Three specimens, No. A136, 12 to 14½ inches long from Kambara, Fiji Islands.

The specimen numbered A136 has dorsal I, 14; anal I, 17; eye equals interorbital; another specimen has dorsal I, 13; anal I, 17; eye slightly greater than interorbital width; the other has dorsal I, 13; anal I, 18; eye slightly greater than interorbital width.

Another specimen, No. 08847, M. C. Z. 29774, 13 inches long from Funafuti, has dorsal I, 14; anal I, 18; eye equals interorbital.

**HEMIRAMPHIDAE.*****Hemiramphus dussumierii* CUVIER & VALENCIENNES.**

Hist. Nat. Poiss., 1846, **19**, p. 33 (24), pl. 554. GÜNTHER, *Fische der Südsee*, 1909, **8**, p. 354.

Five specimens, No. A117,  $8\frac{1}{2}$  to 10 inches long from Namuka, Tonga Islands, give the following measurements:—

Dorsal I, 15; A. I, 14; dorsal and anal scaled, the anal especially so; ventral nearer caudal than head; scales 52?

Dorsal I, 13; A. I, 13; dorsal scaled, the anal slightly so; ventral midway between head and base of caudal, slightly nearer head if anything; scales 52?

Dorsal I, 14; A. I, 13; dorsal and anal scaled; ventral exactly midway between head and base of caudal; scales 55.

Dorsal I, 13; A. I, 13; dorsal and anal scaled; base of ventral slightly nearer caudal than head; scales about 55.

Dorsal I, 14; A. I, 14, no scales on dorsal; anal closely scaled; base of ventral midway between head and caudal, scales about 52; eye equals inter-orbital, 1.25 in postorbital part of head.

The collection also contains the following specimens:—

No. 09034,  $3\frac{1}{2}$  inches long from Mille, Marshall Islands. No. 08947, 8 inches long from Kusaie, Caroline Islands. Twenty-one specimens (young) from Fakarava, Paumotu Islands. Seven specimens  $8\frac{1}{8}$  to  $10\frac{1}{4}$  inches long, and Nos. A121, M. C. Z. 29731, A122, 8 and 11 inches long, from Vavau, Tonga Islands. No. A147,  $11\frac{1}{2}$  inches long from Suva, Fiji Islands. One specimen, No. 09013 (young) from Guam. This specimen had dorsal 15; anal 14; scales about 52; ventral midway between caudal and head.

***Hemiramphus affinis* GÜNTHER.**

Cat., 1866, **6**, p. 267.

One specimen, No. 09045, M. C. Z. 29503,  $4\frac{3}{4}$  inches long from Tarawa, Gilbert Islands. Dorsal I, 15; scales about 60; ventral nearer caudal than head.

One specimen, No. 08958,  $9\frac{1}{10}$  inches long, from Kusaie, Caroline Islands.

Two specimens taken in the Caroline Islands, one No. 08958,  $9\frac{1}{10}$  inches long at Kusaie, and one No. 09058, 3 inches long at Moen. This last specimen has 16 dorsal rays and 16 anal rays, ventral midway between head and caudal.

Seventeen specimens from Marshall Islands, two of them, No. 08959,  $5\frac{7}{10}$  and  $5\frac{1}{2}$  inches long from Wotje Atoll; fourteen of them (young) No. 09075 and one small mutilated specimen, No. 09041 from Arhno.

**Hemiramphus far** (FORSKÅL).

GÜNTHER, *Fische der Südsee*, 1909, **8**, p. 337.

*Esox far* FORSKÅL, *Descript. Anim.*, 1775, p. 67.

No. A118, a specimen 17 inches long and No. A119, M. C. Z. 29730, 15 inches long from Vavau, Tonga Islands.

**Zenarchopterus dispar** (CUVIER & VALENCIENNES).

GÜNTHER, *Fische der Südsee*, 1909, **8**, p. 358.

*Hemirhamphus dispar* CUV. & VAL., *Hist. Nat. Poiss.*, 1846, **19**, p. 42 (58), pl. 558.

*Zenarchopterus vaisiganis* JORDAN & SEALE, *Bull. U. S. Bur. Fish.*, 1906, **25**, p. 208, fig. 11

Two specimens, Nos. 09022, and 08925, M. C. Z. 29366,  $6\frac{1}{2}$  and  $6\frac{1}{10}$  inches long from Kusaie, Caroline Islands. Fourteen specimens, Nos. 08881 and 08993,  $4\frac{3}{4}$  to  $6\frac{1}{4}$  inches long, and No. 05943, in very bad condition, all from Suva, Fiji. Two specimens, No. 09094, M. C. Z. 29390 from Guam, very bad condition, unidentifiable with certainty, with longer bill than the others, but this seems to be an age character.

All these specimens have been compared with specimens in the U. S. National Museum, with three specimens of *Z. dispar* from the Philippines, with types and cotypes of *Z. vaisiganis*, with descriptions and figures in Cuvier & Valenciennes, Bleeker, and in Day, and no differences can be detected by which to separate them from *Z. dispar*; *Z. vaisiganis* seems identical.

**EXOCHOETIDAE.**

**Exocoetus volitans** LINNÉ.

*Syst. Nat.*, ed. 10, 1758, p. 316. JORDAN & EVERMANN, *Bull. U. S. Fish. Comm.*, 1905, **23**, pt. 1, p. 133, fig. 45.

No. 05809,  $1\frac{9}{16}$  inches long from tow-net, open Pacific, Albatross, Sept. 8, 1899, 8 P. M., in Lat.  $4^{\circ}$ ,  $35'$  N., Long.  $136^{\circ}$ ,  $54'$  W.

This is provisionally identified as above, it being too small for positive identification.

Back dark brown, lower parts silvery; dark brown band extending between the posterior half of dorsal and anal and extending somewhat on fins; base of caudal dark brown; pectorals pale with a large very dark brown blotch, occupying upper posterior half of fin, but not extending to the tips of the rays which are pale.

**Cypsilurus speculiger** (CUVIER & VALENCIENNES).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 209, fig. 13 (poor).

*Exocoetus speculiger* CUV. & VAL., Hist. Nat. Poiss., 1846, **19**, p. 69 (94). GÜNTHER, Fische der Südsee, 1909, **8**, p. 366.

No. A200, M. C. Z. 29765, two specimens 10 and 11 inches long from off Guam.

**Cypsilurus bahiensis** (RANZANI).

JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1905, **23**, pt. 1, p. 136.

*Exocoetus bahiensis* RANZANI, Nov. Comm. Ac. Sci. Inst. Bonon., 1842, **5**, p. 326, pl. 38. GÜNTHER, Fische der Südsee, 1909, **8**, p. 369.

No. A184, 12 inches long from Arhno, Marshall Islands.

This specimen agrees very well with Day's description (Fishes of India, p. 519) except that, in our specimen, the anal fin is inserted opposite the end of the first third of the dorsal. Day says that it commences below the last third of dorsal fin, but his figure (Plate 121, fig. 10) shows that it commences very slightly in advance of the middle of the dorsal.

**ATHERINIDAE.**

**Atherina lacunosa** FORSTER.

BLOCH & SCHNEIDER, Syst. Ichth., 1801, p. 112. Descript. Anim. Ed. Lichtenstein, 1844, p. 298. CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1835, **10**, p. 337 (454).

Sixteen specimens, No. 09078, 1 to  $2\frac{1}{4}$  inches long from Wotje Atoll, Marshall Islands. Also M. C. Z. 29464, No. 09084,  $1\frac{3}{4}$  inches long, from Moen, Truk Group, Caroline Islands.

Dorsal VI to VII — I, 9 to I, 10; anal I, 12 to I, 14; scales about 44 or 45 counting entire longitudinal series. Of six specimens three have 6 dorsal spines

and three have 7; only one has 9 rays, the rest have 10. Of the anal rays, one has 12, four have 13, the others have 14.

***Atherina endrachtensis* QUOY & GAIMARD.**

Voy. Uranie, Zool., 1825, p. 334. GÜNTHER, Cat., 1861, 3, p. 401.

Four specimens from Marshall Islands, No. 09035,  $1\frac{1}{2}$  inches with dorsal VII-I, 10; anal I, 10 or 11 from Likiep and three specimens, No. 09071,  $1\frac{9}{16}$  to  $2\frac{1}{8}$  inches long from Ahrno. Origin of dorsal a little nearer ventral than anal.

1. D. VII-I, 9; A. I, 10 or 11; scales 42 counting all the developed scales in longitudinal series.

2. D. VI-I, 9; A. I, 10 or 11; scales 42.

3. D. V-I, 9; A. I, 11; scales 42.

Fourteen specimens from Moen, Truk Group, Caroline Islands, as follows:—

No. 09084 (part) six specimens  $1\frac{5}{8}$  to  $1\frac{7}{8}$  inches long and No. 08906 (part) eight specimens, M. C. Z. 29394, to  $1\frac{3}{4}$  inches long.

No. 08906, had D. VI-I, 9; A. I, 10 or 11 for seven specimens, the other specimen has D. VII-I, 9; A. I, 10 or 11.

Twenty-seven specimens, No. 09055 (poor condition) 1 to  $1\frac{5}{16}$  inches long, from Suva, Fiji Islands. Five specimens,  $\frac{13}{16}$  to  $1\frac{3}{8}$  inches long from Rangiroa, Paumotu Islands.

One specimen, part of No. 09017,  $1\frac{5}{8}$  inches long from Guam.

Head  $2\frac{2}{3}$  in length; depth  $5\frac{4}{5}$ ; eye about equal interorbital,  $2\frac{4}{5}$  in head; snout about  $\frac{4}{5}$  of eye; mouth very oblique, maxillary reaching anterior margin of eye; origin of dorsal slightly nearer ventral than anal, about midway between tip of snout and base of caudal.

We have identified this as *A. endrachtensis*, although it differs slightly from current descriptions, most noticeably in length of snout and width of interorbital. It is close to *A. vaigiensis*, but is generally more slender and with a deeper caudal peduncle, proportionally smaller eye, and considerably longer snout.



***Atherina vaigiensis* QUOY & GAIMARD.**

Voy. Uranic. Zool., 1825, p. 335.

Fifteen specimens, No. 05820,  $3\frac{1}{2}$  to  $4\frac{3}{4}$  inches long from Makemo, Paumotu Islands. Six specimens No. 09017,  $1\frac{1}{2}$  to 2 inches long from Guam. One hundred and thirty-eight specimens from Moen, Truk Group, Caroline Islands, as follows:—

M. C. Z. 29394, No. 08906, forty-eight specimens  $1\frac{1}{2}$  to  $2\frac{1}{2}$  inches, M. C. Z. 29488, No. 09084, thirty-one specimens  $1\frac{1}{4}$  to  $2\frac{1}{2}$  inches, and No. 08983, fifty-nine specimens 1 to  $3\frac{3}{4}$  inches long.

Of the 59 specimens twenty examined show dorsal spines to vary from IV to VI, and rays 1, 10 or 11; anal I, 14 to I, 16; there are but two with IV spines in dorsal, seven with V, and eleven with VI. There are five with 10 dorsal rays, the others having 11 rays. There are three with 14 anal rays, sixteen with 15 rays, and one with 16 rays. There seems to be a true spine in front of the anal and a simple ray in front of the dorsal. Scales range from 43–46 but they cannot be counted with certainty, three of them apparently having 43, thirteen 44, two 45, and two 46. The eyes vary somewhat in relation to interorbital, but this is due doubtless to the action of the preservative. In some instances the eye is very little longer than interorbital width, in others somewhat more so, and in others very much more so. Some of these specimens have a slightly longer maxillary than others, and some are somewhat darker than others. These latter differences do not seem to be related to any particular variation shown in the other differences mentioned.

Günther has identified this species, erroneously we believe, with *Atherina lacunosa*. It is very close to, if not identical with, *Atherina forskalii* of Rüppell. It agrees with Day's description and figure of *A. forskalii*.

***Atherina uisila* JORDAN & SEALE.**

Bull. U. S. Bur. Fish., 1906, **25**, p. 216, fig. 23.

One specimen No. 09046,  $3\frac{1}{2}$  inches long from Wotje Atoll, Marshall Islands. Dorsal VI–I, 9; anal I, 12; scales 44 (48).

## MUGILIDAE.

***Liza caeruleomaculatus* (LACÉPÈDE).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 217.

*Mugil caeruleomaculatus* LACÉPÈDE, Hist. Nat. Poiss., 1803, **5**, p. 385, 386, 389, 392.

Sixteen specimens from Caroline Islands, No. 09090, fifteen specimens  $1\frac{1}{8}$  to  $1\frac{3}{4}$  inches long from Moen and one specimen, No. 09020,  $6\frac{1}{4}$  inches long from Kusaie. Thirty specimens, No. 05818,  $\frac{1}{2}$  to  $2\frac{3}{4}$  inches long from Vavau, Tonga Islands. Sixteen specimens, M. C. Z., 27510,  $\frac{3}{4}$  to  $2\frac{1}{8}$  inches long, from Tongatábu, Tonga Islands. One specimen M. C. Z. 29532, 2 inches long from Suva, Fiji Islands. Three specimens, No. 08981 (part) each  $1\frac{1}{2}$  inches long from Guam.

***Liza melinoptera* (CUVIER & VALENCIENNES).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 217.

*Mugil melinoptera* CUV. & VAL., Hist. Nat. Poiss., 1836, **11**, p. 108 (146).

Three specimens  $1\frac{1}{2}$  to  $1\frac{3}{5}$  inches long from Tongatábu, Tonga Islands. M. C. Z. 29418 (1 specimen).

***Liza troschelii* (BLEEKER).**

*Mugil troschelii* BLEEKER, Nat. Tijds. Ned. Ind., 1858, **16**, p. 277. GÜNTHER, Cat., 1861, **3**, p. 448.

Seventeen specimens,  $2\frac{3}{4}$  to  $4\frac{1}{2}$  inches long and No. 05813, 4 inches long from Makemo, Paumotu Islands. Thirty specimens, 05814,  $1\frac{1}{3}$  to 4 inches long from Bora Bora, Society Islands. One specimen, No. 09095, M. C. Z. 29529,  $4\frac{1}{2}$  inches long, from Ponapi, Caroline Islands. Five specimens, No. 08933, M. C. Z., 29506,  $\frac{3}{4}$  to  $2\frac{1}{4}$  inches long from Jaluit, Marshall Islands. Three specimens, Nos. 08884-6,  $4\frac{1}{8}$  to  $5\frac{1}{8}$  inches long, and two specimens, M. C. Z. 29509, 2 and  $2\frac{7}{8}$  inches long from Suva, Fiji Islands. Ten specimens, 5 to  $6\frac{1}{4}$  inches long, from Aitutaki, Cook Islands. Three specimens Nos. 08877, 08972, 08968,  $2\frac{3}{8}$  to 3 inches long from Funafuti, Ellise Islands. Nine specimens, No. 08980, 1 to 2 inches long from Guam. Seventeen specimens from Tonga Islands, M. C. Z. 29479, 1 specimen, 14 specimens, M. C. Z. 29484,  $\frac{1}{2}$  to  $2\frac{3}{4}$  inches long from Eua, Friendly

Group, and No. A115, a specimen  $9\frac{3}{4}$  inches long, No. 05817,  $4\frac{1}{2}$  inches long, No. 08940,  $4\frac{3}{4}$  inches long.

A115, has in upper lip a single row of outer close set teeth and behind these a band of slightly smaller teeth, close set and in several series; anal rays 9; scales 34, 11 in transverse series, pectoral pale, no axillary spot; at least the anterior third of anal in advance of soft dorsal.

***Liza vaigiensis* (QUOY & GAIMARD).**

*Mugil vaigiensis* QUOY & GAIMARD, Voy. Uranie, Zool., 1825, p. 337, pl. 59, fig. 2.

*Mugil vaigiensis* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 218.

One specimen, No. 08827, 7 inches long from Suva, Fiji Islands. Three specimens, Nos. 08843, 08970-71,  $2\frac{7}{16}$  to  $3\frac{3}{4}$  inches long from Funafuti, Ellice Islands. Eight specimens, No. 09042, M. C. Z. 29478, 2 to  $2\frac{1}{2}$  inches long from Marshall Islands. Four specimens No. 08984, M. C. Z. 29473,  $1\frac{3}{8}$  to  $1\frac{5}{8}$  inches long from Moen, Truk Group, Caroline Islands. Ten specimens from Paumotu Islands, seven of them No. 05815,  $1\frac{5}{8}$  to  $3\frac{7}{8}$  inches long from Makemo, and Nos. A28,  $8\frac{1}{2}$  inches, A13, M. C. Z. 29785,  $8\frac{3}{8}$  inches, and A26,  $8\frac{1}{8}$  inches long from Rangiroa. No. A146, M. C. Z. 29781, a specimen 8 inches long from Suva, Fiji Islands.

In the A numbers the scales are 26 plus a few rudiments, 9 in cross series from front of dorsal to vent; minute wide set teeth in upper jaw in a single series; anal 8; all have black pectorals with lower part pale.

Four specimens from Tonga Islands, one of them, No. 05819, 3 inches long from Vavau, and three specimens  $1\frac{3}{8}$  to  $1\frac{5}{8}$  inches long from Tongatābu.

Fourteen specimens, No. 09016 (young), M. C. Z. 29531, from Guam.

*L. vaigiensis* and *L. melinopteras* are separated only by the numbers of anal rays, the former having eight and *L. melinopteras* having nine. The last anal ray is frequently divided to the base and it is difficult to say whether there are 8 or 9 rays. We do not believe the species different, Günther (Fische der Südsee) unites them.

The name *vaigiensis* has priority.

***Liza borneensis* (BLEEKER).**

*Mugil borneensis* BLEEKER, Nat. Tijds. Ned. Ind., 1851, 2, p. 201. DAY, Fishes of India, 1876, p. 357, pl. 76, fig. 1.

One specimen, No. 08810, M. C. Z. 29794,  $5\frac{1}{2}$  inches long (poor condition), from Kusaie, Caroline Islands. Three specimens from Vavau, Tonga Islands, No. A131,  $5\frac{3}{4}$  inches long; No. 08893,  $8\frac{1}{2}$  inches long, and No. A120,  $11\frac{5}{8}$  inches long, No. A120 has teeth in two rows in upper jaw; dorsal IV-8; anal III, 9; scales 35, 11 in cross series. Nos. 08810 and A131, M. C. Z. 29778, show no teeth in upper jaw, the latter has 19 scales before dorsal, a moderately long axillary scale, otherwise it agrees very well with Day's description of *L. borneensis*.

***Liza compressa* (GÜNTHER).**

*Mugil compressus* GÜNTHER, Cat., 1861, 3, p. 51.

One specimen, No. 08815 (about 6 inches long), from Kusaie, Caroline Islands.

***Liza crenilabis* (FORSKÅL).**

*Mugil crenilabis* FORSKÅL, Descrip. Anim., 1775, p. 73.

*Querimana crenilabis*, JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 218.

Four specimens, No. 08981,  $1\frac{1}{4}$  to  $1\frac{1}{2}$  inches long from Guam. Four specimens, No. 05816, M. C. Z. 29376,  $1\frac{3}{8}$  to  $1\frac{7}{8}$  inches long from Makemo, Paumotu Islands.

No. A193, a specimen  $8\frac{7}{8}$  inches long from Jaluit, Marshall Islands. No. A193 has head 4.66 in body; depth 4.17; eye 4 in head; dorsal IV-1, 8; anal III, 9 or 10; first dorsal midway between snout and base of caudal; origin of anal slightly in advance of dorsal; origin of first dorsal over 10th scale, second over 21st; a long scale in axil of pectoral and in axis of ventral and one on each side of spinous dorsal.

***Neomyxus*.**

The genus *Myxus* based on *M. elongatus* Günther, Cat., 3, 466, has according to Günther "a single row of teeth on the upper jaw, sometimes in the lower and on the palate; upper lip not particularly thick."

Specimens in the U. S. National Museum from Bateman Bay, N. S. Wales, Australia, called *Myxus elongatus*, agree in having a moderately thick upper

lip, with a single row of teeth which are short, compressed and either rounded or slightly notched and slightly constricted at the base; lower lip with an outer fringe of fine simple cilia and some very much finer, scattered ciliae on its upper surface; many rows of small, sharp, curved teeth on vomer and palatines.

*Chaenomugil* of Gill is based on *Mugil proboscideus* Günther. The generic characters according to Gill, Proc. Acad. Nat. Sci., Phila., 1863, p. 169, are: "the longitudinal cleft of the mouth, the narrow and pointed lower jaw and the thick and angular upper lip"; the last of which is the only one in this description which actually separates it from *Myxus*.

In Fishes of the Hawaiian Islands, Jordan & Evermann give as generic characters of *Chaenomugil*, "Cleft of mouth lateral; lower jaw narrow; denticiform cilia in very many series, broad flat and somewhat paved; upper lip very thick; no adipose eyelid."

Species of *Chaenomugil proboscideus* in the U. S. National Museum collected at Mazatlan by Dr. Jordan, and probably identified by him, agree in the above characters and differ from *Myxus elongatus* in having no vomerine or palatine teeth; they also agree with the specific requirements of *C. proboscideus* as given by Günther.

In Fishes of Hawaiian Islands, Jordan & Evermann describe and figure a species which they identify as *Chaenomugil chaptali* and include in its synonymy *Myxus* (*Neomyxus*) *scleteri* Steindachner. They give another species which they identify as *Myxus pacificus* Steindachner, but in the synonymy of the genus *Myxus* they give *Neomyxus* Steindachner, based on *N. scleteri*.

Specimens in the U. S. Bureau of Fisheries reserve series, and U. S. National Museum labeled *Chaenomugil chaptali* from the Hawaiian Islands, being the specimens upon which Jordan & Evermann based their descriptions, agree neither with the generic requirements of *Chaenomugil* nor *Myxus* but agree perfectly with Steindachner's description of *Myxus* (*Neomyxus scleteri*) in which the rather slender labial ciliaform, pectinate, movable teeth are in two rows in each lip with sometimes a portion of a third row indicated. The character of these teeth, so widely different from those of *Myxus*, and the difference in the number of rows from those of *Chaenomugil* were indicated by Steindachner as sufficient basis for a new subgenus. We believe it, however, to be of generic value and that *Neomyxus* is a good genus.

In Fishes of Samoa, Jordan & Seale have represented the genus *Myxus* with one species, *M. leuciscus*, and *Chaenomugil* with two species, *C. chaptali* Eydoux & Souleyet and *C. nauticus* Bryan & Herre.

In the synonymy of *C. chaptali* they place *Myxus pacificus* Steindachner, and in a translation of Steindachner's description by Jordan & Evermann in Fishes of Hawaii, it is indicated that there are two rows of small movable teeth on the upper lip. Steindachner states that the intermaxillary has a band of small movable teeth in which those of the outer row are larger than those of the other rows; the border of the mandible is sharp, with a horizontal row of small movable teeth; he also distinctly states that the upper lip is rather small and the eye has a well developed adipose eyelid.

This last character removes it from *Chaenomugil* or *Myxus*. In the description of *Chaenomugil nauticus* Bryan & Herre, the teeth are not described with sufficient definiteness to indicate clearly whether it is a *Chaenomugil* or *Neomyxus* but the upper lips "not thick" would indicate that it belongs to the latter genus. Furthermore there is nothing in the description to indicate that it is not a *Neomyxus*. In the larger number of scales, large eye?, narrow interorbital, and long first ray of dorsal and of anal it seems to differ from any described species.

***Neomyxus chaptali* (EYDOUX & SOULEYET).**

*Mugil chaptali* EYDOUX & SOULEYET, Voyage Bonite. Zool., 1842, 1, p. 171, pl. 4, fig. 1.

*Myxus (Neomyxus) sclateri* STEINDACHNER, Sitz Ak. Wiss. Wien, 1878, 77, p. 384.

*Chaenomugil chaptalii* JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, 23, pt. 1, p. 40, fig. 49.

One specimen, No. 08834,  $3\frac{1}{2}$  inches long from Funafuti, Ellice Islands, three specimens, No. 08981, each 2 inches long from Guam; three specimens; No. 08914, M. C. Z. 29514,  $1\frac{3}{4}$  to 2 inches long from Arhno Atoll, Marshall Islands; twenty-two specimens, No. 05816,  $1\frac{7}{8}$  to  $2\frac{7}{8}$  inches long from Makemo, Paumotu Islands.

No. 08834 has head 3.73 in length; depth 4.17; eye 3.8 in head; interorbital 2.37; dorsal midway between snout and base of caudal; origin of anal one half in advance of dorsal; maxillary hidden; cilia in two rows in each jaw; dorsal IV-1, 9; A. II, I, 10; scales 13 or 14-44 or 45.

One of No. 05816,  $2\frac{7}{8}$  inches long had head 3.65 in length, depth 4.2; eye 3 in head; dorsal midway between snout and base of caudal; anal origin  $\frac{1}{2}$  in advance of dorsal; maxillary hidden; cilia in two rows in each jaw; dorsal IV-I, 9; anal II, I, 10; scales 13 or 14-45; preorbital serrated at extremity.

### SPHYRAENIDAE.

#### *Sphyraena obtusata* CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1829, **3**, p. 350 (258).

*Sphyraena forsteri* JORDAN & SEALE, Bull. Bur. Fish., 1906, **25**, p. 219, not of Cuvier & Valenciennes.

One specimen,  $1\frac{1}{2}$  inches long from Moen, Truk Group, Caroline Islands. Two specimens, No. A141,  $14\frac{1}{2}$  inches long, and A142, 16 inches long, from Suva, Fiji Islands.

No. A141 M. C. Z. 29719, has 85 developed scales; two black spots on caudal peduncle on right side, the anterior of which is on lateral line, the posterior near the end of the series of large scales just above lateral line; on left side two spots, first on lateral line and second just below the lateral line and in line with front half of soft dorsal.

No. A142: Head 3.26 in length without caudal; eye 5.88 in head, equal to interorbital; snout 2.25; maxillary 2.12; mandible 1.49; dorsal V-I, 9; A. I, 8; developed scales in longitudinal series just above lateral line about 85. There are two spots on right side of caudal peduncle not so far back as in the other specimen, the posterior spot just below the lateral line; on the left side there is only one spot, on the caudal peduncle, the lower part of which touches the lateral line.

These specimens have been compared with a specimen about  $9\frac{1}{2}$  inches long from Apia, Samoa, identified by Jordan & Seale as *Sphyraena forsteri*, and we can detect no differences except those that can be accounted for by the difference in size. It shows the following measurements:—

Head 3.17; depth 6.70; eye 5.70; snout 2.18; maxillary 2.18; mandible 1.50; interorbital 6.33; dorsal V-I, 9; anal I, 8; scales about 85.

The specimen which Jordan and Seale identified as *Sphyraena obtusata* is not available.

**Sphyraena forsteri** CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1829, **3**, p. 261 (353) and La Sphyrène de Forster, *ibid.*, 1831, **7**, p. 382 (509).  
BLEEKER, Nat. Tijds. Ned. Ind., 1852, **3**, p. 82.

*Sphyraena toxsuma* FOWLER, Journ. Acad. Nat. Sci. Phila., 1904, ser. 2, **12**, p. 502, pl. 9, fig. 2 (middle).

One specimen, No. A140,  $17\frac{3}{4}$  inches long from Suva, Fiji Islands.

This specimen agrees almost exactly with the description and figure of *Sphyracna toxsuma* Fowler (*loc. cit.*). Our specimen has 120 developed scales, but counting to a line across from origin of marginal caudal rays there are only 110.

Head from tip of snout 3.23 in length without caudal, from tip of lower jaw 2.97; eye 4.88 in head, considerably greater than interorbital, 2.28 in snout; maxillary not quite reaching eye, 2.21+ in head; mandible 1.46+; dorsal V-I, 10; anal II, 8; scales 13-120-13 (oblique rows counted downward and forward from front of first dorsal to and including the one in lateral line, and from lateral line to front of anal).

*S. toxsuma* is based on a specimen which Fowler considers specifically identical with a species described by Bleeker and referred with doubt to *S. forsteri*.

Fowler considers Günther's Südsee figure of a fish from Tahiti as certainly referable to *S. forsteri*. It shows more longitudinal scales and a much smaller eye.

*S. forsteri* of Günther, Cat., 2, p. 337, is doubtless the same as Bleeker's, so far as the description indicates, but his figure in Südsee is of a different species with a much smaller eye. The statement in the description that the scales are 90 must be an error, as many more are shown in the figure.

The description of "*Sphyraena forsteri*" in Histoire Naturelle des Poissons, **3**, is based on a drawing made by Forster from a specimen taken at Otaiti, but the description is brief and insufficient and there is no character mentioned to distinguish it. It is stated, however, that the form is exactly that of the *Sphyraena* of Europe. In that species the eye is 8 in head and the scales 150 according to Cuvier & Valenciennes. But nothing indicates that these are so in *S. forsteri*. In the additions and corrections in vol. 7 (Hist. Nat. Poiss.), it is stated however that further specimens show that it is really different. Its dorsal and ventrals are advanced, as in *S. jello*, in front of the points of the pee-



toral, *the eye is very large*, therefore it would seem that if the name of Cuvier & Valenciennes is used it must be applied to a large-eyed species, such as *S. forsteri* of Bleeker, and of Günther Catalogue 2, and it will include *S. toxuma* Fowler. But it is not *S. forsteri* of Günther's Südsee, with its small eye, accordingly the latter must be identified with some other species or be given a new name. It may be *Sphyraena jello* Cuvier & Valenciennes, with Day's description of which the figure agrees fairly well.

*Sphyraena forsteri* of Jordan & Seale, Fishes of Samoa is specifically identical with the form that we have identified with *S. obtusata*.

### POLYNEMIDAE.

#### *Polydactylus kuru* (BLEEKER).

*Polynemus kuru* BLEEKER, Nat. Tijds. Ned. Ind., 1851, 2, p. 600. GÜNTHER, Cat., 1860, 2, p. 325.

Twenty-three specimens, No. 05836, M. C. Z. 29779,  $2\frac{1}{4}$  to 8 inches long from Nukuhiva, Marquesas Islands. Dorsal VIII-L, 13; anal III, 11; scales about 60; pectoral filaments 6; caudal long, upper lobe 3.33 in total length.

### FISTULARIDAE.

#### *Fistularia petimba* LACÉPÈDE.

Hist. Nat. Poiss., 1803, 5, p. 349, 350.

*Fistularia depressa* GÜNTHER, Fische der Südsee, 1881, 7, p. 221.

Twenty specimens (young), from Papeete, Tahiti, Society Islands. Two specimens, No. 09074 (small, dried up), from Arhno Atoll, Marshall Islands. One specimen, No. 08900,  $8\frac{1}{2}$  inches long from Moen, Truk Group, Caroline Islands. No. 05810,  $14\frac{1}{4}$  inches long from Vavau, Tonga Islands. No. 05812,  $4\frac{1}{4}$  inches long from Suva, Fiji Islands. Three specimens from the Paumotu Islands as follows: Nos. A67, M. C. Z. 29724, 26 inches long, and A64, 26 inches long from Makemo; and 05811,  $10\frac{1}{4}$  inches long from Fakarava.

## SYNGNATHIDAE.

**Corythoichthys conspicillatus** (JENYNS).

*Syngnathus conspicillatus* JENYNS, Zool. Voy. Beagle. Fish, 1842, pt. 4, p. 147, pl. 27, fig. 4. GÜNTHER, Cat., 1870, 8, p. 174.

Two specimens, No. 08929, a male  $5\frac{1}{3}$  inches long and No. 08930, a female  $5\frac{1}{2}$  inches long, from Jaluit, Marshall Islands.

The male specimen has dorsal 28; rings 17+37. The female specimen has dorsal 29; rings 17+36. M. C. Z. 29387.

**Corythoichthys specifer** (RÜPPELL).

*Syngnathus specifer* RÜPPELL, Neue Wirb. Fische, 1835, p. 143, taf. 33, fig. 4. GÜNTHER, Cat., 1870, 8, p. 172.

One specimen, No. 08992,  $5\frac{1}{16}$  inches long from Kusaie, Caroline Islands.

**Microphis brachyurus** (BLEEKER).

*Syngnathus brachyurus* BLEEKER, Verh. Bat. Genoot., 1853, 25, p. 16. Nat. Tijds. Ned. Ind., 1854, 7, p. 105. GÜNTHER, Cat., 1870, 8, p. 184.

Two specimens, Nos. 08990-1, each  $5\frac{1}{2}$  inches long from Kusaie, Caroline Islands.

No. 08990 has the rings 21+22; dorsal on  $\frac{1}{2}+8$ ; dorsal rays 39; head 4+ in total length; snout not quite twice rest of head. No. 08991, M. C. Z. 29401, has the rings 21+23; dorsal on  $\frac{1}{2}+8$ ; dorsal rays 42; head 4+ in total length; snout nearly twice rest of head.

**Hippocampus guttulatus** CUVIER.

Règne Anim. ed. 2, 1829, 2, p. 363. GÜNTHER, Cat., 1870, 8, p. 202.

One specimen, No. 09031, 4 inches long from Suva, Fiji Islands, an adult with pouch full of young.

Dorsal rays 17; body rings 11; branching filaments on the most prominent spines of head and body, some elsewhere over the body, these mostly simple. Color, uniform dark brown.

## HOLOCENTRIDAE.

**Holocentrus spinifer** (FORSKÅL).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 223.

*Sciæna spinifer* FORSKÅL, Descript. Anim., 1775, p. 49.

No. A81,  $12\frac{3}{4}$  inches long, from Makemo, Paumotu Islands.

Traces of red spots behind eye and base of pectoral; no distinct whitish spot on caudal peduncle above, but it is slightly lighter or silvery; preopercle very oblique; not vertical as in *H. caudimaculatus*.

**Holocentrus tiereoides** BLEEKER.

Nat. Tijds. Ned. Ind., 1853, **5**, p. 334. BRYAN & HERRE, Occ. Papers Bishop Museum, 1903, **2**, p. 128.

No. 05844,  $4\frac{1}{4}$  inches long, and No. 05845,  $4\frac{1}{2}$  inches long from Papeete, Tahiti, Society Islands; No. 08966,  $5\frac{1}{4}$  inches long from Jaluit, Marshall Islands.

**Holocentrus punctatissimus** CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1829, **3**, p. 160 (215). JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 224.

Nos. 05843,  $2\frac{7}{8}$  inches long, 05841, 4 inches long, 05842, 4 inches and 05837,  $4\frac{1}{2}$  inches, from Makemo, Paumotu Islands. M. C. Z. 29389.

**Holocentrus diadema** LACÉPÈDE.

Hist. Nat. Poiss., 1802, **4**, p. 335, 372, 374, pl. 32, fig. 3. JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1905, **23**, pt. 1, p. 159, pl. 10.

One specimen, No. 05846,  $2\frac{5}{8}$  inches long from Fakarava, Paumotu Islands.

**Holocentrus sammara** (FORSKÅL).

BLEEKER, Atlas Ichth., 1877-78, **9**, tab. 360, Trachichth. **6**, fig. 9 (figure only).

*Sciæna sammara* FORSKÅL, Descript. Anim., 1775, p. 48.

*Flammeo achromopterus* FOWLER, Proc. Acad. Nat. Sci. Phila., 1904, p. 236, fig. 6.

No. 08875,  $5\frac{1}{2}$  inches long from Taritari, Gilbert Islands. Four specimens from Paumotu Islands, No. 05840, 6 inches long, and No. 05839, M. C. Z. 29372,  $6\frac{1}{8}$  inches long from Makemo, and two specimens (young) from Fakarava.

Three specimens, Nos. 08869, 08870, 08871,  $3\frac{5}{8}$ ,  $5\frac{1}{4}$  and  $5\frac{3}{4}$  inches long from Suva, Fiji Islands.

The two specimens from Makemo seem to be typically colored, except the dorsal which lacks the black spot on the front of spinous portion, but there is a faint suggestion of a dusky band below the upper margin of the membrane; and there are milky white blotches at the upper margin of the membrane immediately behind each spine. In this respect they agree with Bleeker's figure of this species in *Atlas Ichth.*, 9, pl. 360, fig. 5.

The one from Taritari is much paler in color, the longitudinal bands hardly indicated, and those only on the back above the lateral line; faint spots on cheek and spinous dorsal similar to those above.

In reserve series of Bureau of Fisheries the specimens marked *H. laevis* from Dr. Jordan's Samoan collections, and regarding which he says there is never any black on spinous dorsal, two are similar in coloration to our pale examples of *H. sammara* from Makemo; one has a black blotch on the front of spinous dorsal, but is otherwise indistinguishable from the other specimens, except that the bands along the sides are a little more distinct than in the other two; we cannot separate them from *H. sammara*. In *Fishes of Samoa*, *H. thorntonensis* Fowler is included in synonymy of *H. sammara*, which cannot be correct if Fowler's figure can be relied upon, as it has with lower jaw included a very different head.

#### CARANGIDAE.

##### *Scomberoides sanctipetri* (Cuvier & Valenciennes).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, 23, pt. 1, p. 181.

*Chorinemus sancti petri* Cuv. & Val., Hist. Nat. Poiss., 1831, 8, p. 279 (379), pl. 236.

No. A10, a specimen 19 inches long from Nukahiva, Marquesas Islands. Depth 4 in length to end of scales; head 5; eye (not orbit) 5 in head, about 1.5 in snout; maxillary reaches to posterior margin of eye; dorsal spines do not overlap, not reaching each other; dorsal VII, 1, 20; anal II, 1, 18; teeth in several series in upper jaw anteriorly, becoming two series posteriorly, the other series are the largest anteriorly, the inner is the larger of the two posterior series; in lower jaw the teeth are similar to those of upper jaw, but the

outer teeth are the smaller all the way around the jaw; soft dorsal with an outer, large dark brown blotch, covering most of the elongated portion of fin.

***Scomberoides tolooparah* (Cuvier).**

*Lichia tolooparah* Cuvier, Rüppell's Atlas, 1828, p. 91.

Two specimens, Nos. 08828, 08830, each 8 inches long from Suva, Fiji Islands.

Two specimens, No. 09003,  $3\frac{1}{8}$  and  $5\frac{1}{2}$  inches long from Rangiroa, Paumotu Islands. One specimen, No. 08848,  $4\frac{1}{2}$  inches long from Vavau, Tonga Islands. No. 08978,  $4\frac{1}{4}$  inches long from Funafuti, Ellice Islands. No. 09026,  $2\frac{5}{8}$  inches long from Gilbert Islands. Six specimens from Nukuhiva, Marquesas Islands, M. C. Z. 29497 (3 specimens) as follows: Nos. 05795, three specimens 2 to  $2\frac{1}{2}$  and 05825, three specimens  $8\frac{1}{2}$ ,  $9\frac{1}{2}$ , and  $9\frac{7}{8}$  inches long. Three specimens from Marshall Islands, as follows, Nos. 09065,  $1\frac{1}{4}$  inches long from Arhno; 08932,  $1\frac{5}{8}$  inches long from Jaluit; 09040,  $1\frac{3}{4}$  inches long.

The  $8\frac{1}{2}$  inch specimen has depth 3.41 in length; head 4.83; eye 4.23 in head; snout 3.6; maxillary reaching nearly to posterior margin of eye; dorsal VII, I, 20; anal II, I, 18.

The  $9\frac{1}{2}$  inch specimen has depth 3.74 in length; head 4.92; eye 4.55 in head; snout 3.41; maxillary reaching to posterior margin of eye; dorsal VII, I, 21; anal II, I, 19.

The  $9\frac{7}{8}$  inch specimen has depth 3.62 in length; head 4.88; eye 4.30 in head; snout 3.58; maxillary reaching to posterior margin of eye; dorsal VII, I, 19; anal II, I, 18. The seven dorsal spines include the first procumbent spine which is sometimes concealed under the skin, there are only 6 vertical spines, these all overlapping. The teeth in the upper jaw are in several rows anteriorly, two posteriorly, the outer teeth larger anteriorly and the inner posteriorly; in the lower jaw there are two rows for the entire extent of jaw, the outer of close set incisor-like teeth, the inner conical, not so close set; on each side of the symphysis of lower jaw are one or two enlarged canines in the inner row; a large dark brown blotch occupying the angle and greater portion of elongated part of soft dorsal.

We cannot distinguish these from *S. sanctipetri* except in depth and fewer dorsal rays in one specimen and the overlapping dorsal spines. Inasmuch as the

type of *S. sanctipetri* was a 20 inch specimen and the specimens described in the Hawaiian Fishes, 16 $\frac{1}{4}$  inches long and all the *S. tolooparah* in this latter work were of small size (1 to 10 $\frac{1}{4}$  inches), it suggests that *S. sanctipetri* is only the adult form of *S. tolooparah*.

**Trachurops crumenophthalma** (BLOCH).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 230.

*Scomber crumenophthalmus* BLOCH, Ichth., 1793, **10**, p. 65, pl. 343

Nos. A46, M. C. Z. 29780, and A45 each 9 inches long from Fakarava, Paumotu Islands.

**Caranx melampygus** CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1833, **9**, p. 87 (116). JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 230.

Fifteen specimens as follows from Vavau, Tonga Islands: Nos. 08890-92, three specimens 6 $\frac{5}{8}$  to 8 inches long, No. 05855, nine specimens 3 $\frac{1}{4}$  to 4 $\frac{1}{2}$  inches long, No. A126, M. C. Z. 29786, 8 $\frac{7}{8}$  inches long, No. A127, 11 $\frac{3}{4}$  inches long and No. A124, 13 inches long. Three specimens from Funafuti, Ellice Islands, Nos. 08979, 3 $\frac{3}{4}$  inches long, 08856, 08841, 3 $\frac{5}{8}$  and 6 $\frac{1}{2}$  inches long. Thirteen specimens from Paumotu Islands: Nos. 05854, M. C. Z. 29375, twelve specimens 3 $\frac{1}{2}$  to 4 $\frac{1}{2}$  inches long from Fakarava, and 05856, 5 inches long from Makemo. Two specimens No. 05857, 2 $\frac{5}{8}$  to 2 $\frac{7}{8}$  inches long from Bora Bora, Society Islands. One specimen, No. 08829, 8 $\frac{1}{2}$  inches long from Suva, Fiji Islands. One specimen, No. 09087 (part), 3 inches long from Marshall Islands. No. 05824, seventeen specimens, 2 $\frac{3}{4}$  to 8 $\frac{3}{4}$  inches long from Nukuhiva, Marquesas Islands. The smallest specimen has 5 or 6 broad dark cross bands. We are unable to identify these with any other species. They agree fairly well with *C. melampygus*, except that they lack the dark spots on the body.

**Caranx forsteri** CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1833, **9**, p. 81 (107).

*Caranx hippos* GÜNTHER, Cat., 1860, **2**, p. 449.

Two specimens, Nos. 08876-7, 7 $\frac{1}{2}$  and 9 $\frac{1}{4}$  inches long from Taritari, Gilbert Islands. Six specimens, Nos. 08851, 08845, M. C. Z. 29800, 08850, M. C. Z.

29800, 08844, M. C. Z. 29810, 08842, 08839, M. C. Z. 29800, 3 to  $4\frac{3}{4}$  inches long from Funafuti, Ellice Islands. One specimen, No. 09087,  $3\frac{1}{4}$  inches long from Marshall Islands.

**Caranx ignobilis** (FORSKÅL).

Descript. Anim., 1775, p. 55. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 231.

Nos. A6, A8, A9, M. C. Z. 29751, each 14 inches long from Nukuhiva, Marquesas Islands.

There are about thirty-three scutes, counting all in straight portion of lateral line; there are more than twenty-seven shown in the figures of Rüppell (*C. sanson*) and Jordan & Evermann, when counted as above.

**Caranx ferdau** (FORSKÅL).

GÜNTHER, Fische der Südsee, 1876, **5**, p. 134, taf. 87, 88.

*Scomber ferdau* FORSKÅL, Descript. Anim., 1775, p. 55.

*Carangoides ferdau* JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 198, fig. 77.

No. A71, a specimen  $13\frac{1}{2}$  inches long from Makemo, Paumotu Islands.

Head 3.42 in length to base of caudal; depth 2.43; eye 4.75 in head; snout 3.04; maxillary 2.53; pectoral 2.57 in length to base of caudal, slightly shorter than longest dorsal ray; base of dorsal 2.26 in length to base of caudal, slightly greater than its longest ray; longest anal ray 3.66; base of anal equal to pectoral; dorsal rays 31; anal 26; scutes 29 on right side, 25 on left.

Color: no spots now evident on body; axil of pectoral dusky; margin of soft anal pale.

This specimen is somewhat deeper than indicated by most descriptions and seems most like that represented by Günther's Südsee, plate 87; it also has many points in common with *Caranx gilberti* Jordan & Seale in Fishes Samoa, p. 234.

**Trachinotus** LACÉPÈDE.

Day's description and figure of *Trachynotus baillonii* do not agree. It is stated that "the maxillary nearly reaches to beneath the centre of the orbit," but in the figure it barely reaches the front of the eye. It is also stated that the

lobes of the dorsal and anal, if laid back, nearly reach the end of those fins. In the figure, the dorsal reaches about the middle and the anal a little beyond the middle. If the length of the lobes of dorsal and anal fin are of any importance, Day's figure of *T. baillonii* is certainly not the same as Rüppell's *C. quadripunctatus*, which in other respects it somewhat resembles; but Day's figure does not show as great length of vertical fin lobes as he indicated in the description, nor does it show them as long as those described by Lacépède, but the latter's figure is poor and does not show the fins as long as he describes them. Day's *T. russellii* agrees better with Lacépède's figure of *C. baillonii*. The lobes of the fin are not as long as Lacépède describes, but they are longer than Day's figure of *T. baillonii*, and the spots are much larger. Lacépède's description and poor figure of *C. baillonii* are insufficient for the identification of the species, but they show longer vertical fin lobes than are indicated by Cuvier & Valenciennes and by Day for this species, and in this respect they are much more like the *T. russellii* of Cuvier & Valenciennes and of Day.

Cuvier & Valenciennes record four species of this group of *Trachinotus* with black spots. Day includes them all in two species and Jordan & Seale recognize the same two species in Oceania. Under *T. russellii*, Jordan & Seale include *T. coppingeri* Günther. In the description and figure of this species Günther does not indicate that there are any spots.

Comparisons of the descriptions and figures indicate that the names have been incorrectly applied by Day, and his description and synonymy is somewhat mixed. Three of the four species mentioned by Cuvier & Valenciennes are valid. Day's *T. russellii* in part should become *T. baillonii* in the synonymy of which *T. russellii* of C. & V. should be placed, and Day's figure and part of his description of *T. baillonii*<sup>1</sup> is probably Cuvier & Valenciennes's *T. oblongus* to the synonymy of which *T. coppingeri* belongs, if it is a synonym of any species. There are thus in these waters three valid species with black spots: *T. baillonii* Lacépède, *T. quadripunctatus* Rüppell, *T. oblongus* Cuvier & Valenciennes.

In the collection there are two of the three species: *T. baillonii* and *T. oblongus*.

The three species may be separated by the following key which is made up from descriptions and figures and from specimens.

<sup>1</sup>To the synonymy of *T. quadripunctatus* (Rüppell) belongs *T. baillonii* Day in part, not figure.



A. Ventrals comparatively long; long dorsal and anal lobes.

B. Comparatively blunt muzzle, comparatively small eye; maxillary reaching front of pupil; body deep, 2.22 in length without caudal,

*baillonii*.

BB. Comparatively sharp muzzle, large eye; maxillary reaching middle of eye; body more slender, 2.44 in length without caudal,

*quadripunctatus*.

AA. Ventral fins comparatively short, comparatively short dorsal and anal lobes; muzzle rather sharp; eye large; maxillary short, reaching front of eye,

*oblongus*.

**Trachinotus ovatus (LINNÉ).**

GÜNTHER, Cat., 1860, 2, p. 481. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 235.

*Gasterosteus ovatus* LINNÉ, Syst. nat. ed. 10, 1758, p. 296.

No. A123, a specimen  $8\frac{3}{4}$  inches long from Vavau, Tonga Islands.

**Trachinotus baillonii (LACÉPÈDE).**

CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1831, 8, p. 317, 319 (431).

*Caesimorus baillonii* LACÉPÈDE, Hist. Nat. Poiss., 1802, 3, p. 92, 93, pl. 3, fig. 1.

*Trachionotus russellii* CUV. & VAL., Hist. Nat. Poiss., 1831, 8, p. 320 (436). DAY, Fishes of India, 1876, p. 233 (in part), pl. 51B, fig. 3.

*Plate 2, figure 1.*

Five specimens. Nos. 08987, M. C. Z. 29799, 08809, 08857, 08854, 08852, M. C. Z. 29799,  $4\frac{3}{8}$  to  $9\frac{7}{8}$  inches long from Funafuti, Ellice Islands.

No. 08857,  $9\frac{7}{8}$  inches long, has head 4.28 in length; depth 2.22; eye 4.3 in head; snout 3.73; dorsal VI-I, 24; anal II-I, 23; scales about 90; lobe of soft dorsal 2.95 in length; lobe of anal 2.85 in length.

Color in spirits, silvery grayish on back, lobes of soft dorsal, anal, and caudal dusky; four spots on lateral line on right side, the anterior very small, next two half diameter of eye, the last minute; three spots on left side, first a little anterior to a line from last dorsal spine, .6 diameter of eye, next smaller, and last very small under posterior part of soft dorsal.

No. 08352,  $5\frac{1}{8}$  inches long, has head 3.65 in length; depth 2.28; eye 3.71 in head; snout 4; dorsal lobe about 3.27 in length; anal 3.65; upper caudal lobe 2.87; lower 2.71; dorsal VI-I, 24; anal II-I, 24.

First rays of all fins dusky at tips; two very small dusky spots on each side of lateral line.

No. 08809, a small broken specimen, has dorsal VI-I, 23; anal II-I, 22; anal lobe reaches to last anal ray; black-tipped fins.

No. 08987, 4.75 inches long, has dorsal VI-I, 23?; anal II-I, 23; anal lobe reaches to posterior fifth of anal fin.

**Trachinotus oblongus** CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1831, **8**, p. 321 (437).

*Trachynotus baillonii* DAY, Fishes of India, 1876, p. 233 (in part), and pl. 51A, fig. 1.

*Trachynotus russellii* DAY, Fishes of India, 1876, p. 233 (in part), synonymy. STEAD, Edible Fishes of New South Wales, 1908, p. 92, pl. 62.

*Plate 1.*

Seven specimens, Nos. A1-4, A5, 29733, 7 and 11, M. C. Z. 29734, from 10.5 to 12.5 inches long, from Nukuhiva, Marquesas Islands.

No. A1, M. C. Z. 29732, 11 inches long, has head 4.12 in length; depth 2.27; eye 3.42 in head; snout 4; dorsal VI-I, 24; anal II-I, 23; dorsal lobe 4.3 in length; anal lobe 4.12; each reaching slightly beyond middle of fins; scales about 97 or 98, counting all.

Color in spirits: general color silvery with grayish on back, one large black spot about size of eye on each side under the lobe of the dorsal and on lateral line; in front of this spot and just above middle of pectoral is a very faint spot, immediately above lateral line, its lower edge touching it.

No. A2,  $10\frac{3}{4}$  inches long, has head 4.14 in length; depth 2.23; eye 3.76 in head; snout 4.08; lobe of soft dorsal 4.51 in length, 1.53 in its base; lobe of anal 4.41, 1.67 in its base; dorsal VI-I, 23; anal II-I, 23.

One large black spot on each side about in line with front rays of soft dorsal, .75 of the spot on one side and .66 of the spot on the other side above the lateral line diameter of the spot 1.3 in eye.

No. A3,  $10\frac{5}{8}$  inches long, has dorsal VI-I, 23; anal II-I, 23; dorsal lobe 1.40 in base of dorsal fin; anal lobe 1.55 in the base of fin; two large black spots on right side of body, the greater portion of the anterior one above lateral line, and directly under sixth dorsal spine, its diameter about 1.3 in eye; a second spot under 11th dorsal ray, about .66 of it above lateral line; on left side one

large black spot about on a line just anterior to 6th dorsal spine; a very small spot partly on lateral line and under 11th dorsal ray.

No. A4,  $10\frac{1}{8}$  inches long, has head 4.15 in length; depth 2.09; eye 3.83 in head; snout 3.83; dorsal VI-I, 24; anal II-I, 23; dorsal lobe 1.27 in dorsal base; anal lobe 1.36 in anal base. A large black spot on right side, about .66 of it above lateral line, its largest diameter about 1.08 in eye; situated about under middle of soft dorsal lobe; a small faint dusky spot just under 3d dorsal spine, partly on lateral line, but mostly above it; a similar large spot on left side and correspondingly located; a faint trace of very small black spot back of this and under 15th ray of dorsal.

No. A5,  $9\frac{1}{2}$  inches long, has dorsal VI-I, 24; anal II-I, 23; dorsal lobe 1.52 in dorsal base; anal lobe 1.65 in anal base.

On the right side a very small spot under 3d dorsal spine; almost wholly above lateral line; a large black spot under middle of dorsal lobe, about .66 of the spot above lateral line, its diameter about 1.18 in eye; on left side a spot .38 of eye and under 3d dorsal spine, almost wholly above lateral line; another large one under middle of lobe of dorsal .84 of eye in diameter, about .6 of it above lateral line.

No. A7,  $12\frac{1}{2}$  inches long has head 4.25 in length; depth 4.52; eye 3.7 in head; snout 4; maxillary 2.74; dorsal VI-I, 24; anal II-I, 24; lobe of dorsal 1.79 and of anal 1.70 in base of each fin respectively; scales 24-97-34.

On right side, a trace of a small spot below 2nd dorsal spine, entirely above lateral line; a large black one about size of eye, under anterior part of soft dorsal, about .6 of it above lateral line; another minute spot on lateral line about under 15th ray of dorsal; on left side is a small faint spot under 2d dorsal spine, wholly above lateral line; under anterior part of soft dorsal is a large spot, about .6 of it above lateral line, considerably larger than eye; a slight trace of a minute spot, entirely on lateral line and under 15th dorsal ray; another slight trace of a spot on lateral line on the middle of caudal peduncle, a similar one on right side; lobes of dorsal, anal, and caudal dusky.

No. A11, 11 inches long. On right side a spot almost wholly above lateral line and under 3d dorsal spine, small but distinct; a large spot about size of eye, under middle of dorsal lobe, about .6 of it above lateral line, on left side is the merest trace of a spot above lateral line and under first dorsal spine; a large

spot about size of eye, under anterior part of soft dorsal, about .66 of it above lateral line; merest trace of another spot under 15th dorsal ray and nearly on lateral line.

### EQUULIDAE.

#### **Leiognathus fasciatus** (LACÉPÈDE).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 273.

*Clupea fasciata* LACÉPÈDE, Hist. Nat. Poiss., 1803, **5**, p. 425, 460, 463.

One specimen, No. 08816, 4 inches long from Suva, Fiji Islands.

#### **Leiognathus splendens** (CUVIER.)

*Equula splendens* CUVIER, Reg. Anim. ed. 2, 1829, **2**, p. 212. DAY, Fishes of India, 1876, p. 239, pl. 52, fig. 3.

Two specimens, Nos. 08882, M. C. Z. 29795, 08826,  $3\frac{3}{4}$  and  $4\frac{1}{4}$  inches long from Suva, Fiji Islands.

#### **Leiognathus edentula** (BLOCH).

*Scomber edentulus* BLOCH, Ichth., 1795, **12**, taf. 428.

*Equula edentula* DAY, Fishes of India, 1876, p. 238, pl. 52, fig. 1.

Five specimens (young)  $1\frac{1}{8}$  to  $1\frac{3}{4}$  inches long from Suva, Fiji Islands.

### APOGONIDAE.

#### **Apogon** LACÉPÈDE.

In 1854 in Nat. Tijds. Ned. Ind. **6**, p. 321, Bleeker founded the genus Apogonichthys, basing it on *A. perditx* and giving, before his description of *A. perditx*, a list of species comprised in the new genus; *A. auritus* (Cuvier & Valenciennes, **7**, p. 332) heading this list.

The distinctive characters of Apogonichthys, he states, are the smooth preopercle and intramarginal crest, and the presence of palatine teeth. Later, in the description of *A. perditx* he states that the lateral line anteriorly consists of perceptible simple tubes and inconspicuous tubes posteriorly. Thus the only character wherein Apogonichthys differs from Apogon is in the smooth

preopercle and intramarginal crests. This character is not constant and we do not deem it of generic importance.

In 1903, in Bull. U. S. Fish. Comm., p. 180, Jordan & Evermann establish the genus *Fowleria* basing it on *A. auritus*, the first species Bleeker mentioned under his description of *Apogonichthys*. They state that *Fowleria* differs from *Apogonichthys* solely in the character of the lateral line, which is developed only on the anterior part of the body. This character does not separate *Fowleria* from *Apogonichthys* as defined by Bleeker. Cuvier & Valenciennes in the original description of *A. auritus* do not mention the lateral line or the palatine teeth. Should the palatine teeth prove to be absent, *Fowleria* could stand if based on the absence of palatine teeth.

In 1905, in Bull. U. S. Fish Comm., p. 210, Jordan & Evermann establish the genus *Foa*, basing it on *Fowleria brachygrammus* Jenkins, described on page 447, and state that "the genus differs from *Amia* [*Apogon*] only in the character of the lateral line which is developed only on the anterior part of the body, the preopercle being as in *Mionorus* without serrations \* \* \* and differing from *Apogonichthys* in having palatine teeth."

In 1906 in *Fishes of Samoa*, Bull. Bureau of Fisheries, page 248, Jordan & Seale still further characterize *Foa*, by the entire preopercle, incomplete lateral line and the presence of teeth on the palatines. In the same report, page 250, they place *Fowleria* in the synonymy of *Apogonichthys*, stating that *Apogonichthys*, "is based on a species *Apogon auritus* Cuvier & Valenciennes, which we have not seen. It is, however, very closely related to three Samoan species, with which it is doubtless congeneric. These species differ from the group called *Foa*, in having no teeth on the palatines. In all of them there is a large black ocellus on the opercle, and the lateral line, although interrupted, shows rudimentary pores on the caudal peduncle."

The characters given above for *Foa* are not different from those given by Bleeker for *Apogonichthys* and do not therefore separate it from *Apogonichthys*. If the three species mentioned above do not possess palatine teeth, they should be placed in the genus *Fowleria* and not in *Apogonichthys* since *Apogonichthys* possesses palatine teeth.

Jordan & Richardson, in *Fishes of the Philippines*, in Bull. U. S. Bur. Fish. 1908, 27, p. 255, state that "the original type of *Apogonichthys* Bleeker is *A.*

*perdix* Bleeker (Floris). This species has an incomplete lateral line, an entire preopercle and teeth on the palatines. The genus *Apogonichthys* is therefore the same as *Foa*, and *Fowleria (aurita)* is generically distinct." The validity of *Fowleria* depends upon whether *A. aurita* has palatine teeth.

Professor Vaillant has kindly examined the type of *Apogon auritus* in the Museum at Paris and states that there are teeth upon the vomer but none on the palatines, and that it can be said that it has palatal but not palatine teeth. *Fowleria*, based on the absence of palatine teeth, is therefore a valid genus.

*Amia* Gronovius, Zoophylaceum, 1763, p. 80 (nonbinomial).

*Apogon* Lacépède, Hist. Nat. Poiss., 1802, 3, p. 411 (*ruber*).

*Apogonichthys* Bleeker, Nat. Tijds, Ned. Ind., 1854, 6, p. 321 (*perdix*).

*Foa* Jordan & Evermann, Bull. U. S. Fish Comm., 1905, 23, pt. 1, 210 (*brachygrammus*).

#### **Apogon frenatus VALENCIENNES.**

Nouv. Ann. Mus. Hist. Nat., 1832, 1, p. 57, pl. 4, fig. 4. GÜNTHER, Cat. 1859, 1, p. 241. GÜNTHER, Fische der Südsee, 1873, 1, p. 19, taf. 19, fig. A.

*Amia frenata* BLEEKER, Atlas Ichth., 1876, 7, p. 75, 89, 8, tab. 342, Perc. 64, fig. 2.

*Amia melanorhynchus* BLEEKER, Atlas Ichth., 1877, 8, tab. 343, Perc. 65, fig. 1 (not description).

*Apogon snyderi* JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1903, 22, p. 180.

One specimen, No. 05828,  $3\frac{7}{8}$  inches long from Papeete, Tahiti, Society Islands.

We have carefully compared this specimen and specimens of *A. synderi* in the reserve series U. S. Bur. Fish. with Valenciennes's description and figure of *A. frenatus* and cannot find that they differ. Jordan & Evermann (*loc. cit.*) propose the name *A. synderi* for the fish which they say Günther in Südsee erroneously calls *A. frenatus*; they neglect, however, to say wherein Günther is in error. We find no discrepancies between figures and descriptions of Günther and Valenciennes, unless it be a slightly narrower lateral stripe in Valenciennes's figure, which we consider unimportant. Bleeker has a figure and description of *A. frenatus* which agrees with our specimens and which he says is the same as the *A. frenatus* of Günther's Catalogue, but not the same as the *A. frenatus* described and figured in his Südsee, the latter being according to Bleeker *A. fasciata*. But Bleeker's description and figure of *A. fasciata* do not agree;

the figure agrees in its serrations with *A. frenatus*, but not in its color; and in the description of *A. fasciatus* both the serrations and color certainly indicate a different species.

Bleeker figures a species which he calls *A. melanorhynchus*; the figure agrees with our specimens in serrations and color, but his description does not agree in the serrations. In the synonymy of this species he places *Apogon (Pristipogon) frenatus* Klunzinger, and says "*melanorhynchus*, sometimes confounded with *frenata*, appears to me that it ought to be considered as a distinct species with a *chunkier* body and with the intramarginal preopercular crest smooth and the shoulder bone toothed and the *Apogon frenata* of Klünzinger from the Red Sea ought probably to be reported as *melanorhynchus*." But his figure shows *A. melanorhynchus* with intramarginal preopercular crest toothed as in *A. frenatus* of Valenciennes, and the shoulder bone toothed; in *A. frenatus* the shoulder bone is said to be smooth.

In his discussion of the genus *Apogon*, Day says "It seems also questionable whether any considerable value can be placed upon the serrations about the bones of the head, especially of the orbits, as such appear to be more distinct in some specimens than in others, and many vary with age."

In the seven specimens of *A. snyderi* in the U. S. Bur. Fish. reserve series, varying in size from  $2\frac{7}{8}$  to  $4\frac{5}{8}$  inches, the serrations of the preopercular margins and orbit are constantly present, but vary somewhat in amount in orbit. In some specimens the shoulder bone is serrated and in some it is not. We judge from this that the serration of the suprascapular or shoulder bone is without value.

#### **Apogon orbicularis** KUHL & VAN HASSELT.

CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1828, 2, p. 115 (155). GÜNTHER, Fische der Südsee, 1873, 1, p. 22, taf. 20, fig. D. DAY, Fishes of India, 1875, p. 65, pl. 17, fig. 7.

Seven specimens, No. 09080, 1 to  $1\frac{1}{2}$  inches long, and No. 08909, M. C. Z. 29533 six specimens 1 inch long, from Moen, Truk Group, Caroline Islands.

#### **Apogon savayensis** (GÜNTHER).

Proc. Zool. Soc. Lond. 1871, p. 656. Fische der Südsee, 1873, 1, p. 21, taf. 19, fig. B. DAY, Fishes of India, 1875, p. 60, pl. 16, fig. 5.

Two specimens, No. 08942, M. C. Z. 29503 (1 specimen)  $2\frac{1}{4}$  inches long, Kusaie, Caroline Islands.

**Apogon ceramensis BLEEKER.**

Nat. Tijds. Ned. Ind., 1852, **3**, p. 256. DAY, Fishes of India, 1875, p. 65, pl. 17, fig. 6.

*Amia ceramensis* BLEEKER, Atlas Ichth., 1876, **7**, p. 75, 91; 1877, **8**, tab. 336, Perc. 58, fig. 1.

No. 08902, six specimens  $\frac{3}{4}$  to 1 inch long and four specimens, No. 09083, M. C. Z. 29517, 1 to  $1\frac{3}{4}$  inches long from Moen, Truk Group, Caroline Islands. Six specimens, No. 09049, 2 to  $2\frac{1}{2}$  inches long from Suva, Fiji Islands. Five specimens, No. 09073,  $\frac{23}{50}$  to  $\frac{3}{4}$  of an inch long, from Arhno, Marshall Islands.

**Apogon vaiulae (JORDAN & SEALE).**

*Foa vaiulae* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 249, fig. 43.

One specimen, No. 09030,  $1\frac{5}{8}$  inches long from Suva, Fiji Islands.

We identify this specimen with *A. vaiulae* after having compared it with the type, although it is somewhat deeper and now shows no shoulder spot, otherwise it agrees perfectly. It is hardly possible that these slight differences, due to difference in size, are of importance.

**Apogon exostigma (JORDAN & STARKS).**

*Amia exostigma* JORDAN & STARKS, Bull. U. S. Bur. Fish., 1906, **25**, p. 238, fig. 31.

No. A87, a specimen  $6\frac{1}{2}$  inches long from Makemo, Paumotu Islands.

Head 2.6 in length to base of caudal; depth 2.7; eye in head 3.84; snout 3.12; interorbital 4.54; maxillary+premaxillary 2.27; longest dorsal spine (3d) 1.78; ray 1.78; longest anal (2d) 5; dorsal VII, I,  $9\frac{1}{2}$ ; anal II,  $8\frac{1}{2}$ ; scales 3-25+5.

Preopercle and intraopercle coarsely serrated or toothed; shoulder bone or scale serrated; pectoral and ventral reaching anal; color same as that given by Jordan & Starks.

**Apogon punctulatus RÜPPEL.**

Neue Wirb. Fische, 1835, p. 88, tab. 22, fig. 4.

*Apogonichthys marmoratus* JORDAN & SEALE, Bull. Bur. Fish., 1906, **25**, p. 250, fig. 44.

One specimen, No. 05868,  $1\frac{3}{8}$  inches long from Vavau, Tonga Islands.



Rüppell's description and figure of *A. punctulatus* do not admit of its being put in the synonymy of *A. auritus* of Day or *A. polystigma* of Bleeker. Rüppell says nothing of palatine teeth, and our specimen agrees very well with the specimens of *A. marmoratus* in the reserve series of the Bureau of Fisheries which are those recorded by Jordan & Seale in Fishes of Samoa. In all particulars our specimen agrees with Rüppell's description of *A. punctulatus*.

**Mionorus waikiki** (JORDAN & EVERMANN).

*Apogonichthys waikiki* JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1903, **22**, p. 179.

One specimen, No. 09067,  $\frac{5}{8}$  of an inch long from Arhno Atoll, Marshall Islands.

Head 2.33 in body; depth 2.8; eye 3; snout 3.42.

This specimen agrees with the description of *M. waikiki*, save for slight differences in color; there are no distinct bars on the fins, and the caudal is plain yellowish.

**Paramia quinquelineata** (CUVIER & VALENCIENNES).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 252.

*Cheilodipterus quinquelineatus* CUV. & VAL., Hist. Nat. Poiss., 1828, **2**, p. 124 (167).

No. 05829, a specimen  $3\frac{1}{8}$  inches long from Papeete, Tahiti, Society Islands. No. 05830, two specimens  $1\frac{3}{8}$  and  $1\frac{3}{4}$  inches long from Vavau, Tonga Islands. M. C. Z. 29470.

**AMBASSIDAE.**

**Ambassis urotaenia** BLEEKER.

Nat. Tijds. Ned. Ind., 1852, **3**, p. 257. Atlas Ichth., 1877, **8**, p. 133, 135, tab. 344, Perc. 66, fig. 2, and tab. 351, Perc. 73, fig. 1. GÜNTHER, Cat., 1859, **1**, p. 224.

Five specimens, No. 08800, 08994, 3 to 4 inches long from Kusaie, and No. 09093, 2 inches long from Ponapi, Caroline Islands. Twelve specimens, No. 08923, M. C. Z. 29486,  $1\frac{3}{4}$  to 2 inches long from Suva, Fiji Islands.

## KUHLIIDAE.

**Kuhlia malo** (CUVIER & VALENCIENNES).

*Dules malo* CUV. & VAL., Hist. Nat. Poiss., 1831, 7, p. 360 (479). DUMONT D'URVILLE, Voyage Pole Sud. Zool. Poissons, 1853, 3, pl. 3, fig. 4.

*Dules mato* LESSON, Voyage Coquille. Zool., 1830, 2, p. 223.

*Dules leuciscus* JENYNS, Zool. Voy. Beagle. Fish., 1842, pt. 4, p. 17.

*Plate 2, figure 2.*

Eight specimens, No. 05827,  $3\frac{1}{2}$  to 6 inches long from Tipaerui River, Papeete, Society Islands, M. C. Z. 29367 (2 specimens).

The eight specimens are from the type locality of *K. malo*. The description of Cuvier & Valenciennes of *K. malo* agrees with our specimens, there being one character in particular,—the dorsal, anal, and ventral have brown spots, separated by whitish lines,—which agrees with our specimens and which emphasizes its separation from current descriptions of *K. malo*.

In the following, measurements are given of our largest specimen (160 mm.) and in parentheses the average measurements of the eight examples:

Head in length to base of caudal 3.39 (3.30); depth 2.88 (2.85); eye in head 3.71 (3.338); snout 3.55 (3.73); maxillary 2.29 (2.346); interorbital 3.12 (3.475); soft dorsal base 1.69 (1.816); anal base 1.21 (1.336); longest dorsal spine (fifth) 2.05 (1.637); last dorsal spine 2.29 (2.168); longest anal spine (third) 2.60 (2.54); pectoral 1.5 (1.45); ventral 1.5 (1.45); dorsal IX, I, II; anal iii, 12 (11 rays in one specimen); scales 6 to 8—42—8 to 9.

General shape and appearance of *Pomoxis*; profile of head slightly concave; preorbital serrate; suborbital entire; preopercle finely serrate on both limbs, its ascending limb concave; maxillary reaching not quite to middle of eye; lower jaw slightly projecting. Scales large anteriorly, rapidly decreasing in size from a line in front of soft dorsal to base of caudal. Color in spirits, silvery gray; cheeks, throat, and breast with brassy reflections; body thickly covered with black spots about size of pupil, these chiefly above lateral line; narrow silvery interspaces giving a reticulated effect; tip of lower jaw black; tips of soft dorsal and anal white; interspinous dorsal membrane dusky, especially at the base and tips of the spines; the soft dorsal with rather large black spots

on the membranes with yellowish white interspaces and with a black anterior upper angle and margin; soft anal similarly colored with a row of black spots on scales at base; pectoral soiled yellowish externally, with a black base behind, and a dusky cross bar near the base; ventrals yellowish translucent with the outer membranes somewhat dusky; caudal with spots similar to soft vertical fins, the extremities of the caudal lobes black with narrow white margin on the upper and lower edges of the lobes; the ends of all the rays black making a narrow terminal margin of black.

**Kuhlia maculata** (CUVIER & VALENCIENNES).

*Dules maculatus* CUV. & VAL., Hist. Nat. Poiss., 1831, 7, p. 357 (475).

? *Moronopsis ciliatus* BLEEKER, Atlas Ichth., 1876, 7, p. 120 (in part) tab. Pere., 38, fig. 1.

*Plate 3, figure 1.*

Eight specimens, Nos. 08996-99, 08802-3, 08805, 08832, 4 to  $5\frac{3}{4}$  inches from Kusaie, Caroline Islands. M. C. Z. 29369 (2 specimens).

In the following, measurements are given of our largest specimen (145 mm.) and in parentheses the average measurements of the eight examples:

Head in length to base of caudal 3.28 (3.275); depth 2.67 (2.86); eye 2.91 (2.838); snout 4.12 (4.185); maxillary 2.33 (2.32); interorbital 3.5 (3.47); soft dorsal base 1.59 (1.675); anal base 1.20 (1.298); longest dorsal spine (fifth) 1.84 (1.81); last dorsal spine 2.50 (2.26); longest anal spine (third) 2.69 (2.59); pectoral 1.45 (1.47); ventral 1.45 (1.47); dorsal IX, I, 11, (12 rays in one specimen); anal iii, 11 in 3, 12 in 5 specimens; scales 5 or 6-42-7 or 8.

The shape and form of this species is similar to that of *K. malo*; preorbital serrated; preopercle finely serrated on its lower limb, the ascending limb entire, except at the upper end where there are a few minute teeth, and it is not concave.

General color of this species is the same as that of *K. malo*, but the dorsal differs in having the membrane of the spinous dorsal not so dusky and with no spots on soft dorsal or on scales at base; the soft dorsal is entirely dusky, most intense at upper anterior angle and along upper margin, with an indication of a longitudinal darker dusky band just above its base; the tips of rays are white; the fine scaly sheaths at the base of the soft dorsal and anal are dusky and without spots; the soft anal not spotted as it was in the other, but the rays are dusky,

most intense at about the middle of their length and near the ends; membrane between the spines and 1st ray entirely dusky and the middle duskiness of the other rays sometimes extends a little on the membranes presenting a sort of interrupted longitudinal band; margin of fin similar to that of the other specimen.

Bleeker's figure in Atlas Ichth., 8, Perc. tab. 46, fig. 2, resembles our specimens in shape, but the spots are scarcely indicated on the body and there are none on the dorsal, anal, or caudal. The description of *Perca ciliata* Kuhl & Van Hasselt in the Hist. Nat. Poiss., 2, p. 38, of Cuvier & Valenciennes, does not agree with our specimens. In the description of *Dules marginatus* Cuvier & Valenciennes, *ibid.*, p. 87, there are a few points that apply to our specimens, but in color ours bear no resemblance to the figure.

**Kuhlia proxima**, sp. nov.

*Plate 3, figure 2.*

Type No. 65889 U. S. N. M. (field no. 08920), 5 inches long from Fiji Islands. Cotype No. 29420 M. C. Z. (field No. 08919),  $3\frac{3}{4}$  inches long from the same place.

Head 3; depth 2.60 in body; eye 2.53 in head; snout 4.12; maxillary 2.35; interorbital 3.66; base of soft dorsal 1.94; last dorsal spine 2.75; longest dorsal spine (fifth) 1.65; longest dorsal ray 1.94; base of anal 1.57; longest anal spine (third) 2.53; longest anal ray 2.53; pectoral 1.65; ventral 1.65 (not quite to vent); dorsal X, I, II; anal III, II; scales 5 (6)-52-9. No. 08920 has D. IX, I, 11.

Body similar in shape to *K. sandvicensis*; eye large, snout short; maxillary reaching to anterior edge of pupil; lower jaw projecting; preopercle serrate on both limbs, its ascending limb not concave; preorbital serrate on its lower anterior edge; scales moderate, rather closely imbricated, decreasing in size to the base of the caudal.

Color generally silvery, darker on back; snout and lower jaw dusky; the membranes of spinous and soft dorsal and anal soiled dusky, extreme edge of dorsal black but not making a black border; a broad dusky terminal margin to the caudal, most intense at end of middle rays. This species differs from *K. sandvicensis* in the longer head; much larger eye; in having the ascending

limb of preopercle serrated, and fewer scales in transverse series; and a wider black terminal caudal margin. It differs from *K. marginata* from Samoa in having more scales in longitudinal series. It lacks the black margin on soft dorsal and anal; and it has a much larger eye; *K. marginata* does not have serrations on the ascending limb of preopercle. It is close to *Dules humilis* of De Vis from Queensland, differing in having a larger eye, shorter snout, and longer third anal spine. In *D. humilis* the second anal spine is as long as and stronger than the third.

***Kuhlia sandvicensis* (STEINDACHNER).**

*Moronopsis argenteus* var. *sandvicensis* STEINDACHNER, Sitz. Ak. Wiss. Wein, 1876, **74**, p. 205 (Beilage **5**, p. 158).

*Moronopsis sandvicensis* STEINDACHNER, Sitz. Ak. Wiss. Wein, 1887, **96**, p. 56 (Beilage **14**, p. 1), taf. 1, fig. 1.

Seven specimens, No. 05826, 2 to  $5\frac{1}{2}$  inches long from Makemo, Paumotu Islands. M. C. Z. 29498 (2 specimens). One specimen (no number)  $1\frac{1}{2}$  inches long from Makatea, Paumotu Islands.

These specimens appear a little deeper than some from Hawaii but their measurements do not show it.

***Kuhlia rupestris* (LACÉPÈDE).**

*Centropomus rupestris* LACÉPÈDE, Hist. Nat. Poiss., 1802, **4**, p. 252, 272.

*Dules haswellii* MACLEAY, Proc. Linn. Soc. N. S. Wales, 1881, **5**, p. 359.

Nos. 08804, M. C. Z. 29458, a specimen 5 in. long, 08807, a specimen  $6\frac{3}{8}$  in. long, 08806, a specimen  $6\frac{1}{4}$  in. long, 08995, a specimen 3 in. long, all from Kusaie, Caroline Islands.

Easily distinguished from *K. maculatus* by the much larger mouth and longer maxillary, which extends to middle of eye, and also by the differences in coloration.

***Kuhlia taeniura* (CUVIER & VALENCIENNES).**

JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1905, **23**, pt. 1, p. 208, fig. 81.

*Dules taeniurus* CUV. & VAL., Hist. Nat. Poiss., 1829, **3**, p. 85 (114).

Fourteen specimens, No. 08917,  $1\frac{3}{4}$  to  $1\frac{1}{8}$  inches long from Arhno Atoll, Marshall Islands.

Two specimens, Nos. 08918, and 09039, M. C. Z. 29505,  $3\frac{1}{8}$  inches long from Marshall Islands.

### SERRANIDAE.

#### **Paracanthistius maculatus** (BLOCH).

BLEEKER, Atlas Ichth., 1876, **7**, p. 25, 26.

*Bodianus maculatus* BLOCH, Ansl. Fische, 1790, **4**, p. 48, pl. 228.

One example, No. A151, 15 inches long, from Funafuti, Ellice Islands.

Head and body spotted; the only spaces without spots are just in front of the vent and just in front of anal; spots all round, none oblong.

#### **Anyperodon leucogrammicus** (CUVIER & VALENCIENNES).

BLEEKER, Atlas Ichth., 1876, **7**, p. 28, Nat. tab. 279, Perc. 1, fig. 4.

*Serranus leucogrammicus* CUV. & VAL., Hist. Nat. Poiss., 1828, **2**, p. 259 (347).

One specimen, No. A153, about 12 inches long, from Funafuti, Ellice Islands.

#### **Cephalopholis argus** BLOCH & SCHNEIDER.

Syst. Ichth., 1801, p. 311.

*Serranus guttatus* (part) DAY, Fishes of India, 1875, p. 24.

*Epinephelus argus* BLEEKER, Atlas Ichth., 1876, **7**, p. 32, 43, tab. 313, Perc. 64, fig. 3. BOULENGER, Cat., 1895, **1**, p. 189.

Three specimens from Jaluit, Marshall Islands, Nos. 08860,  $7\frac{1}{4}$  inches long; 08916, 3 inches long and A191,  $10\frac{1}{4}$  inches long. Nos. A173,  $9\frac{3}{8}$  inches long, and A169, M. C. Z. 29787,  $7\frac{1}{8}$  inches long, from Taritari, Gilbert Islands. Nos. A25, M. C. Z. 29742, 12 inches long, and A17, from Rangiroa, Paumotu Islands. Nos. A152,  $12\frac{1}{2}$  inches long, and A154, M. C. Z. 29743,  $11\frac{1}{4}$  inches long, from Funafuti, Ellice Islands. On all the A numbered specimens there are about 8 cross bands on body, especially distinct posteriorly, each about half as wide as interspaces.

#### **Cephalopholis urodelus** (CUVIER & VALENCIENNES).

*Serranus urodelus* CUV. & VAL., Hist. Nat. Poiss., 1828, **2**, p. 227 (306). GÜNTHER, Fische der Südsee, 1873, **1**, p. 3, fig. A.

*Epinephelus urodelus* BOULENGER (form A), Cat., 1895, **1**, p. 192.

No. 08961, a specimen  $5\frac{4}{5}$  inches long from Jaluit, Marshall Islands.

**Cephalopholis leopardus** (LACÉPÈDE).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 258.

*Labrus leopardus* LACÉPÈDE, Hist. Nat. Poiss., 1802, **3**, p. 518, 521, pl. 30, fig. 1.

No. A179, a specimen  $5\frac{1}{2}$  inches long from Arhno, Marshall Islands. and M. C. Z. 29463, A186,  $4\frac{3}{8}$  inches long from Jaluit, Marshall Islands.

**Ephinephelus merra** BLOCH.

Ausl. Fische., 1793, **7**, p. 17, pl. 329. BOULENGER, Cat., 1895, **1**, p. 241 (form B).

*Serranus hexagonatus* DAY, Fishes of India, 1875, p. 14, pl. 2, fig. 3.

*Epinephelus stellans* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 258.

Six specimens from Paumotu Islands, Nos. 05864,  $6\frac{1}{2}$  inches long, A62, 9 inches, A94 M. C. Z. 29796  $7\frac{3}{4}$  inches, A61,  $7\frac{1}{2}$  inches, all from Makemo, 05867,  $1\frac{7}{8}$  inches long and A27,  $8\frac{3}{4}$  inches long from Rangiroa. No. 05866,  $5\frac{1}{2}$  inches long from Tahiti, Society Islands. No. A185, M. C. Z. 29797,  $6\frac{1}{4}$  inches long from Jaluit, Marshall Islands.

**Epinephelus fuscoguttatus** (FORSKÅL).

BLEEKER, Atlas Ichth., 1876, **7**, p. 34, 57, tab. 307, Perc. 29, fig. 3. BOULENGER, Cat., 1895, **1**, p. 249.

*Perca summana* var. *fuscoguttata* FORSKÅL, Descript. Anim., 1775, p. 42.

Five specimens from Paumotu Islands, Nos. A93,  $8\frac{1}{4}$  inches long, A77,  $9\frac{1}{4}$  inches long, A96,  $9\frac{3}{4}$  inches long, A75, M. C. Z. 29722,  $9\frac{3}{4}$  inches long and 05865, M. C. Z. 29384,  $8\frac{1}{2}$  inches long, all from Makemo; A155, 10 inches long from Funafuti, Ellice Islands; A177, 14 inches long from Rongelab, Marshall Islands. A12, M. C. Z. 29721, Rangiroa, Paumotu Islands.

**Epinephelus caeruleopunctatus** (BLOCH).

BOULENGER, Cat., 1895, **1**, p. 246.

*Holocentrus caeruleopunctatus* BLOCH, Ausl. Fische, 1790, **4**, p. 94, tab. 242, fig. 2.

No. 08928, a specimen  $7\frac{1}{4}$  inches long from Jaluit, Marshall Islands.

**PRIACANTHIDAE.****Priacanthus cruentatus** (LACÉPÈDE).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 229.

*Labrus cruentatus* LACÉPÈDE, Hist. Nat. Poiss., 1802, **3**, p. 522.

No. 05858, a specimen  $8\frac{1}{2}$  inches long from Papeete, Tahiti, Society Islands.

**LUTIANIDAE.****Lutianus kasmira** (FORSKÅL).

*Sciaena kasmira* FORSKÅL, Descript. Anim., 1775, p. 46.

*Holocentrus bengalensis* BLOCH, Ausl. Fische, 1790, **4**, p. 7, Ichth., p. 82, taf. 246, fig. 2.

*Lutianus bengalensis* DAY, Fishes of India, 1875, p. 33, pl. 10, fig. 4. BLEEKER, Atlas Ichth. 1877, **8**, p. 44, 55, 333, Pere. 55, fig. 4.

No. 08865, 5 inches long from Suva, Fiji Islands. This specimen has but 10 dorsal spines, differing from Bloch and Day, who each give 11 dorsal spines. Bleeker found 10 or 11 spines in the dorsal.

**Lutianus gibbus** (FORSKÅL).

DAY, Fishes of India, 1875, p. 43, pl. 13, fig. 2, 3.

*Sciaena gibba* FORSKÅL, Descript. Anim., 1775, p. 46.

Two specimens, Nos. 08866, 5 inches long, and 08868,  $5\frac{3}{4}$  inches long from Suva, Fiji Islands. Four specimens from Paumotu Islands, Nos. A19, 14 inches and A22, M. C. Z. 29741,  $14\frac{1}{2}$  inches long from Rangiroa, A66,  $14\frac{3}{4}$  inches long from Makemo, and A41, M. C. Z. 29758, 9 inches long from Fakarava. No. 108, M. C. Z. 29757,  $9\frac{3}{4}$  inches long from Takaa, Society Islands. No. A166,  $5\frac{3}{4}$  inches long from Taritari, Gilbert Islands. Two specimens from Marshall Islands, Nos. A176, 13 inches long from Rongelab and A183,  $14\frac{1}{4}$  inches long from Arhno Atoll.

**Lutianus marginatus** (CUVIER & VALENCIENNES).

DAY, Fishes of India, 1875, p. 44, pl. 13, fig. 5.

*Diaconope marginata* CUV. & VAL., Hist. Nat. Poiss., 1828, **2**, p. 320 (425).

No. 05869,  $7\frac{1}{4}$  inches long from Makemo, Paumotu Islands. No. 05871,  $3\frac{1}{4}$  inches long, Bora Bora, Society Islands. Three specimens from Caroline



Islands, Nos. 09021, 08814,  $6\frac{1}{2}$  and  $8\frac{1}{4}$  inches long, from Kusaie, and 09011,  $1\frac{3}{8}$  inches long from Truk Group. Two specimens, Nos. 09038, 1 and  $1\frac{1}{4}$  inches long from Arhno Atoll, Marshall Islands, Nos. A137, M. C. Z. 29728 10 inches long and A138,  $11\frac{1}{4}$  inches long from Suva, Fiji Islands. No. A158, M. C. Z. 29729,  $8\frac{3}{4}$  inches long from Taritari, Gilbert Islands.

**Lutianus johnii** (BLOCH).

DAY, Fishes of India, 1875, p. 42, pl. 13, fig. 1.

*Anthias johnii* BLOCH, Ichth., 1793, 9, p. 97, tab. 318.

One specimen, No. 08921, 5.75 inches long, from Suva, Fiji Islands. No. 09050, M. C. Z. 29398, 1.75 inches long from Moen, Truk Group, Caroline Islands. This small specimen is somewhat mutilated and no teeth can be detected on its tongue; otherwise it agrees with *L. johnii*, and is with some doubt, identified as that species.

**Lutianus monostigma** (CUVIER & VALENCIENNES).

*Mesoprius monostigma* CUV. & VAL., Hist. Nat. Poiss., 1828, 2, p. 337 (446). GÜNTHER, Fische der Südsee, 1873, 1, p. 14, taf. 16.

*Lutjanus liglossus* BLEEKER, Atlas Ichth., 1877, 8, 46, 70, tab. 344, Perc. 66, fig. 4.

Seven specimens from Paumotu Islands: Nos. 08823,  $5\frac{1}{2}$  inches long from Anaa, one specimen 5 inches long and A92, M. C. Z. 29768,  $7\frac{1}{8}$  inches, A99,  $8\frac{5}{8}$  inches, A100, M. C. Z. 29769, 8 inches from Makemo, and A35,  $8\frac{5}{8}$  inches, 05861,  $5\frac{1}{4}$  inches from Makatea. Five specimens, Nos. 08986,  $1\frac{1}{2}$  to  $3\frac{1}{4}$  inches long from Moen, Truk Group, Caroline Islands. No. A168, 8 inches long from Taritari, Gilbert Islands.

**Lutianus marginatoides**, spec. nov.

*Plate 4, figure 1.*

Type No. 68943 U. S. N. M. (field No. A74),  $8\frac{1}{4}$  inches long from Makemo, Paumotu Islands.

Head to tip of flaps 2.57 in body; depth 2.39; eye 5.07 in head; snout 3; maxillary 2.69, reaching to front of pupil; mandible 2.49; interorbital 4.71; pectoral 1.26, reaching beyond ventrals to a line from base of last dorsal spine;

ventrals 1.59, reaching just to vent; dorsal X,  $13\frac{1}{2}$ , fourth spine longest, longest ray 3.5 in head; anal III, 8, second anal spine longest, 2.85 in head, longest ray 2.35 in head; preopercle strongly notched; a conspicuous knob on opercle; six rows of scales on cheeks; scales above lateral line in oblique series; counting from front of dorsal to lateral line there are 8 scales, from anal to lateral line 13, scales above lateral line 54, below 48, the formulae being 8-48 to 54-13; no lingual teeth.

Color, greenish gray on back, lighter line of same color on side and belly; dorsal yellowish with light green spines and dusky spines and rays and a broad white-edged dusky margin; caudal very dusky with a narrow white terminal margin, more distinct in middle; other fins all paler; faint light streaks following rows of scales, running obliquely upward and backward above lateral line, horizontally below.

This is close to *L. marginata* but differs in having a considerably smaller eye and somewhat smaller mouth, and it may be *Diacope striata* or *D. axillaris* of Cuvier & Valenciennes, but the descriptions are too incomplete to make the identification certain.

#### THERAPONIDAE.

##### *Therapon maculatus*, spec. nov.

*Plate 4, figure 2.*

Eight specimens, No. 08924, 2 to 5 inches long from Suva, Fiji Islands. M. C. Z. 29494 (2 specimens).

Type, No. 66061 U. S. N. M., 5 inches long, has head 2.86 in length; depth 2.71; eye 3.60 in head; snout 2.5; maxillary 3.27; dorsal XII, 11; anal III,  $9\frac{1}{2}$ ; scales 11-60(+9)-18; 11 scales from front of dorsal to lateral line and 18 from lateral line to anal.

Longest dorsal spine 2 in head; second anal spine longest, 1.89 in head; preopercle strongly denticulate above angle; fine teeth on lower margin; teeth in upper jaw in many villiform bands in front, the band changing into about 3 rows posteriorly; an anterior row of enlarged mixed, incisor-like and canine-like or curved backward conical teeth, the latter longer than the others; lower

jaw with several rows of viliform teeth in front, these becoming 2 rows posteriorly; outer row larger and conical but not so large as in upper jaw.

Color after a long time (9 years) in alcohol, body dark gray with slight reddish tinge; dark on back and still darker on top of head and snout, covered with faint brown spots, one third diameter of eye, approximately arranged in longitudinal rows and faintly evident on caudal fin; each scale with a small silvery spot making narrow longitudinal silvery streaks or lines; pectoral dusky; ventral black except at base and on last or inner ray where it is white; spinous dorsal clouded with purplish brown, each interspinous membrane with black margin which is most evident next to spine in front; soft dorsal margined with dark brown at its upper anterior margin; anal membrane very dark brown, most intense anteriorly.

**Therapon jarbua** (FORSKÅL).

DAY, Fishes of India, 1875, p. 69, pl. 18, fig. 4.

*Sciæna jarbua* FORSKÅL, Descript. Anim., 1775, p. 50.

Six specimens from Suva, Fiji Islands, Nos. 08831,  $7\frac{1}{2}$  inches, 08821, 5 inches, 08883,  $3\frac{1}{4}$  inches, 08922,  $5\frac{1}{4}$  inches, 08889, 7 inches and A144,  $8\frac{3}{4}$  inches. Three specimens from Tonga Islands, Nos. 05862, M. C. Z. 29577,  $4\frac{1}{2}$  inches from Vavau and 05863, M. C. Z. 29578, 08941, M. C. Z. 29373,  $5\frac{1}{4}$  and 7 inches long from Tongatābu.

**SPARIDAE.**

**Lethrinus ramak** (FORSKÅL).

GÜNTHER, Fische der Südsee, 1874, 3, p. 69, taf. 46, fig. B. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 269.

*Sciæna ramak* FORSKÅL, Descript. Anim., 1775, p. 53.

Four specimens from Taritari, Gilbert Islands, Nos. A159, 10 inches, A165, M. C. Z. 29727,  $6\frac{1}{2}$  inches, A170, M. C. Z. 29726,  $10\frac{3}{8}$  inches, A172,  $7\frac{1}{2}$  inches.

**Lethrinus harak** (FORSKÅL).

DAY, Fishes of India, 1875, p. 137, pl. 33, fig. 3.

*Sciæna harak* FORSKÅL, Descript. Anim., 1775, p. 52.

Two specimens, Nos. A143, and 08833, M. C. Z. 29419 (1 specimen),  $6\frac{1}{2}$  inches long from Suva, Fiji. Three specimens, Nos. 08935,  $9\frac{1}{2}$  inches, 08934,

M. C. Z. 29775,  $7\frac{5}{8}$  inches, and A198, M. C. Z. 29723,  $9\frac{1}{2}$  inches long from Kusaie, Caroline Islands. One specimen, No. 08896,  $7\frac{3}{10}$  inches long from Vavau, Tonga Islands.

The specimens from Kusaie have a large dusky oblong spot below lateral line above end of pectoral; axil very dark.

In No. A143 the dusky lateral spot is wanting on right side, with possibly a faint trace on left; axil not so dusky, otherwise no distinguishable differences.

No. 08896, in addition to the lateral spot it has traces of 8 or 9 cross bars on body, which extend on to the side of the abdomen, about on a line with lower base of pectoral.

***Lethrinus mahsenoides* EHRENBERG.**

CUVIER & VALENCIENNES's, Hist. Nat. Poiss., 1830, 6, p. 212 (286). GÜNTHER, Cat., 1859, 1, p. 464. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 270.

Two specimens Nos. 08894 M. C. Z. 29782 and 08895,  $7\frac{1}{4}$  and 7 inches long respectively, from Vavau, Tonga Islands.

No. 08894 had head 2.96 in length; depth 2.69; eye 3.85 in head; snout 2.08; preorbital 2.63; pectoral 3.44 in length; ventral 4.48; longest dorsal spine (4th) 7.79; dorsal X, 9; anal III, 8; scales 6-49-16.

No. 08895 had head 2.95 in length; depth 2.68; eye 3.84 in head; snout 2.18; preorbital 2.82; pectoral 3.46 in length; ventral 4.73; longest dorsal spine (4th) 8.35; dorsal X, 9; anal III, 8; scales 6-49-16.

Head grayish with brownish shades; gill membrane margined with red, still showing quite plainly; body grayish, darker on back, paler on belly; traces of 8 or 9 narrow dusky half bars running somewhat obliquely downward and backward; many scales on back and side, each with a white or pale center; pectoral yellowish; ventral greenish with dusky tips; dorsal and anal with traces of narrow horizontal or oblique narrow bars; caudal yellowish with traces of about 4 broad cross bars.

***Lethrinus moensii* BLEEKER.**

Nat. Tijds. Ned. Ind., 1855, 9, p. 435. GÜNTHER, Fische der Südsee, 1874, 3, p. 61, taf. 46, fig. A. BLEEKER, Atlas Ichth., 1877, 8, p. 115, 7, tab. 297, Perc. 19, fig. 3.

No. 08867,  $4\frac{4}{5}$  inches long, from Suva, Fiji Islands. The specimen is dried and in bad condition; it does not show any color markings. It seems nearer to this species than to any other and is without much doubt correctly identified.

**Lethrinus richardsonii** GÜNTHER.

Cat., 1859, **1**, p. 456.

Six specimens, No. 08903,  $\frac{7}{8}$  to 2 inches long, from Truk Group, Caroline Islands. These specimens are in bad condition, but the color markings show fairly well. No. 05870, 5 inches long, and one specimen  $2\frac{1}{8}$  inches long, from Vavau, Tonga Islands.

**Lethrinella miniata** (FORSTER).

FOWLER, Journ. Acad. Nat. Sci. Phila., 1904, ser. 2, **12**, p. 529.

*Sparus miniatus* FORSTER, Bloch. & Schneider's Ichth., 1801, p. 281.

No. A14, M. C. Z. 29748, about 16 inches long from Rangiroa, Paumotu Islands and No. A58, about  $17\frac{3}{4}$  inches long, from Fakarava, Paumotu Islands.

**Monotaxis grandoculis** (FORSKÅL).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 271.

*Sciaena grandoculis* FORSKÅL, Descript. Animal, 1775, p. 53.

One specimen, No. A181,  $9\frac{7}{8}$  inches long from Arhno, Marshall Islands.

**GERRIDAE.****Xystaema argyreum** (FORSTER).

*Sciaena argyrea* FORSTER, Bloch & Schneider's Syst. Ichth., 1801, p. 344. Descript. Anim. Ed. Lichtenstein, 1844, p. 291.

*Gerres argyreus* GÜNTHER, Cat., 1859, **1**, p. 353; 1862, **4**, p. 263.

One specimen, No. 08855,  $6\frac{1}{4}$  inches long from Funafuti, Ellice Islands.

From the descriptions it is difficult to distinguish this species from *gigas*.

**Xystaema acinaces** (BLEEKER).

*Gerres acinaces* BLEEKER, Nat. Tijds. Ned. Ind., 1854, **6**, p. 194.

*Diapterus acinaces* BLEEKER, Atlas Ichth., 1877, **8**, p. 123-126, tab. 361, Perc. 77, fig. 2.

Three specimens, Nos. 08853,  $4\frac{3}{4}$  inches, 08973,  $3\frac{3}{4}$  inches, 08846,  $4\frac{1}{2}$  inches long from Funafuti, Ellice Islands.

Two specimens from Vavau, Tonga Islands, Nos. A128, about 7 inches long, and A129, M. C. Z. 29293  $5\frac{1}{2}$  inches long.

These agree with Bleeker's description and the plate in Atlas, excepting that our specimen has traces of small dusky spots on the dorsal spines. These specimens are too deep for *X. argyreum* or *X. macrosoma*.

***Xystaema oyena* (FORSKÅL).**

*Labrus oyena* FORSKÅL, Descrip. Anim., 1775, p. 35.

*Gerres oyena* DAY, Fishes of India, 1875, p. 99, pl. 25, fig. 4.

*Diapterus oyena* BLEEKER, Atlas Ichth., 1877, 8, p. 124, 129, tab. 361. Pere. 77, fig. 5.

Nos. 09019, nineteen specimens,  $2\frac{1}{4}$  to 3 inches long, and 09047, five specimens,  $1\frac{1}{2}$  to 3 inches long from Suva, Fiji Islands. Seven specimens from Tonga Islands, one a specimen, M. C. Z. 29388,  $5\frac{1}{2}$  inches long from Tongatābu; 5 specimens, No. 05886, 4 to  $4\frac{1}{4}$  inches long, and one, No. 05887,  $3\frac{1}{4}$  inches long from Vavau. M. C. Z. 29461, No. 08982, three specimens, 2 to  $3\frac{3}{4}$  inches long, from Guam. Nos. 09053, seven specimens 1 to  $1\frac{3}{4}$  inches long from Truk, Caroline Islands, and 09081, seven specimens  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches long from Moen, Caroline Islands.

It is difficult to identify these fishes with any degree of certainty on account of their poor condition and the small size of most of the specimens. According to descriptions they seem to be closely related to *X. limbatus* and *X. kapas*, but they agree best with *X. oyena*. The black on the caudal is more evident in some than in others, but in all, traces of black are evident. They are more remote from *X. argyreum*, the latter being a slender fish.

**MULLIDAE.**

***Upeneus vittatus* (FORSKÅL).**

BLEEKER, Atlas Ichth., 1877-78, 9, tab. 392, Mull., fig. 3. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 273.

*Mullus vittatus* FORSKÅL, Descript. Anim., 1775, p. 31.

No. A145, about  $7\frac{1}{2}$  inches long, from Suva, Fiji Islands.

Black blotch covering membrane at upper angle of spinous dorsal from first to tip of fifth spine; front tip of soft dorsal with black blotch.

This specimen agrees perfectly with Bleeker's figure.

Teeth in both jaws, vomer and palatines not in villiform bands, but very blunt teeth in several rows; lateral line 37.

**Upeneus sulphureus** CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1829, **3**, p. 331 (450). BLEEKER, Atlas Ichth., 1877-78, **9**, tab. 393, Mull. 3, fig. 4.  
*Upenoides sulphureus* GÜNTHER, Cat. 1859, **1**, p. 398. DAY, Fishes of India, 1875, p. 120, pl. 30, fig. 3.

No. 08820, a specimen  $4\frac{1}{2}$  inches long from Suva, Fiji Islands.

**Pseudupeneus moana** JORDAN & SNYDER.

Proc. U. S. Nat. Mus., 1905, **29**, p. 354. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 274.

One specimen, No. 08948,  $4\frac{1}{2}$  inches long from Kusaie, Caroline Islands.

**Pseudupeneus bifasciatus** (LACÉPÈDE).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 258, fig. 107.

*Mullus bifasciatus* LACÉPÈDE, Hist. Nat. Poiss., 1802, **3**, p. 404, pl. 14, fig. 2.

One specimen No. 05847,  $7\frac{5}{8}$  inches long from Papeete, Tahiti, Society Islands.

**Pseudupeneus barberinus** (LACÉPÈDE).

*Mullus barberinus* LACÉPÈDE, Hist. Nat. Poiss., 1802, **3**, p. 406, pl. 13, fig. 3.

*Upeneus barberinus* CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1829, **3**, p. 340 (642). GÜNTHER, Fische der Südsee, 1874, **2**, p. 57, taf. 42.

*Parupeneus barberinus* BLEEKER, Atlas Ichth., 1877, **8**, tab. 393, Mull. 3, fig. 1.

One specimen, No. 08899, M. C. Z. 29576, nearly 7 inches long from Vavau, Tonga Islands. Last ray of dorsal and of anal slightly produced as represented in Lacépède's figure. No. A57 about  $17\frac{1}{4}$  inches long from Fakarava, Paumotu Islands. No trace of black at base of soft dorsal.

Thirteen specimens from Caroline Islands, Nos. 09082, seven specimens  $1\frac{5}{8}$  to  $1\frac{3}{4}$  inches long from Moen, and 08904, M. C. Z. 29490, a specimen  $1\frac{7}{8}$  inches long, and 09054, five specimens  $1\frac{3}{4}$  to  $1\frac{9}{10}$  inches long from Truk.

**Pseudupeneus barberinoides** (BLEEKER).

*Upeneus barberinoides* BLEEKER, Nat. Tijds. Ned. Ind., 1852, **3**, p. 263.

*Upeneus trifasciatus* GÜNTHER, Fische der Südsee, 1874, **2**, p. 59, taf. 44, fig. C. (In part.)

No. 05853, M. C. Z. 29788, five specimens 3 to  $3\frac{5}{8}$  inches long from Vavau, Tonga Islands.

**Mulloides flavolineatus** (LACÉPÈDE).

DAY, Fishes of India, 1875, p. 122, pl. 30, fig. 6. GÜNTHER, Fische der Südsee, 1874, 2, p. 56.

*Mullus flavolineatus* LACÉPÈDE, Hist. Nat. Poiss., 1802, 3, p. 406.

Three specimens (very bad condition)  $5\frac{1}{2}$  to  $6\frac{1}{2}$  inches long, and No. A60,  $10\frac{1}{4}$  inches long from Makemo, Paumotu Islands. No. 05848, a specimen  $5\frac{3}{4}$  inches long from Vavau, Tonga Islands. Nos. 08976 and 08835, 4 and 5 inches long from Funafuti, Ellice Islands. Nos. 05852,  $3\frac{3}{4}$  and 05850, M. C. Z. 29528, three specimens each 4 inches long from Bora Bora, Society Islands. No. 09018,  $3\frac{3}{4}$  inches long from Guam.

These specimens have shorter and more abruptly arched snout than *M. samoensis*, the barbels are longer, reaching considerably beyond the preopercle, while in *M. samoensis* they scarcely reach the preopercle; the spinous dorsal (in young examples) when depressed reaches nearer the soft dorsal than in *M. samoensis*, but this does not hold good in the larger examples.

**Mulloides samoensis** GÜNTHER.

Fische der Südsee, 1874, 3, p. 57, taf. 43, fig. B. JORDAN & EVERMANN, Bull. U. S. Fish Comm. 1905, 23, pt. 1, p. 253, fig. 105.

Four specimens, Nos. 08974, 08975, 08967, 08969, 4 to 5 inches long from Funafuti, Ellice Islands. Two specimens, Nos. 08897, M. C. Z. 29575,  $6\frac{1}{8}$  inches long, and 08898, M. C. Z. 29575,  $7\frac{3}{4}$  inches long from Vavau, Tonga Islands. Four specimens from Paumotu Islands, 2 of them, Nos. A72 and 05851, 8 and  $3\frac{7}{8}$  long from Makemo; No. A53,  $7\frac{7}{8}$  inches long from Fakarava, and No. 05849,  $5\frac{1}{4}$  inches long from Rangiroa. Two specimens, No. 09018, M. C. Z. 29385,  $3\frac{5}{8}$  and 4 inches long from Guam.

While No. A72 has the more slender form of *M. samoensis*, the position of the dorsal and the long barbels is like that of *M. flavolineatus*; the snout is even longer, and less abruptly curved than in the other specimens of *M. samoensis*, and it may be a distinct species; on the other hand all the characters mentioned distinguishing *M. samoensis* and *M. flavolineatus* may be only individual variations of one species.



**POMACENTRIDÆ.*****Pomacentrus pavo* (BLOCH).**

*Chaetodon pavo* BLOCH, Ichth., 1787, 3, p. 44, tab. 198, fig. 1.

No. 05882, M. C. Z. 29503, two specimens from Makemo, Paumotu Islands. Nos. 08863,  $2\frac{1}{2}$  inches long and 08878, 3 inches long from Taritari, Gilbert Islands.

***Pomacentrus nigricans* (LACÉPÈDE).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 281.

*Holocentrus nigricans* LACÉPÈDE, Hist. Nat. Poiss., 1802, 4, p. 332, 367, 370.

Five specimens, Nos. 05877-05881, 3 to 4 inches long from Makemo, Paumotu Islands. No. 05860, M. C. Z. 29495, 3 inches long from Papeete, Tahiti, Society Islands. No. 08946, M. C. Z. 29496, 3 inches long from Kusaie, Caroline Islands, in a fresh water stream, Feb. 9, 1900.

***Pomacentrus lividus* (FORSTER).**

GÜNTHER, Fische der Südsee, 1881, 7, p. 228, taf. 124, fig. F. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 283.

*Chaetodon lividus* FORSTER, Bloch & Schneider's Syst. Ichth., 1801, p. 235.

Two specimens, Nos. 08949,  $3\frac{3}{8}$  inches, and 08951, M. C. Z. 29485,  $3\frac{1}{2}$  inches long, from Kusaie, Caroline Islands.

***Abudefduf sordidus* (FORSKAL).**

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, 23, pt. 1, p. 274.

*Chaetodon sordidus* FORSKÅL, Descript. Anim., 1775, p. 62.

Four specimens from the following localities in the Paumotu Islands: No. 05874,  $3\frac{3}{4}$  inches, Makatea; No. A56,  $5\frac{3}{4}$  inches, Fakarava; No. 08824, M. C. Z. 29395, 5 inches, Anaa; No. 05875, M. C. Z. 29502,  $1\frac{5}{8}$  inches, Rangiroa.

***Abudefduf septemfasciatus* (CUVIER & VALENCIENNES).**

*Glyphisodon septemfasciatus* CUV. & VAL., Hist. Nat. Poiss., 1830, 5, p. 346 (463).

*Glyphidodon septemfasciatus* DAY, Fishes of India, 1877, p. 386, pl. 81, fig. 7. BLEEKER, Atlas Ichth., 1877-78, 9, tab. 409, Pomac. 10, fig. 5.

No. 05873, thirty-two specimens 2 to  $5\frac{1}{2}$  inches long from Makatea, Paumotu Islands.

The black spot on the caudal peduncle at the end of dorsal fin is very distinct in all of the specimens up to about 3 inches in length, a little fainter in those  $3\frac{1}{4}$  and  $3\frac{1}{2}$  inches long, and still fainter in specimens  $3\frac{3}{4}$ ; in specimens  $4\frac{3}{4}$  it is barely visible and in a specimen  $5\frac{1}{2}$  inches long it does not show.

One specimen,  $2\frac{9}{10}$  inches long from Makemo, Paumotu Islands. The band below 3-5 dorsal spine is somewhat more intensified at its upper end than the same band in other specimens of like size from Makatea.

Nine specimens from Makemo, Paumotu Islands, as follows: Nos. A68,  $5\frac{1}{8}$  inches; A83, 7 inches; A84,  $6\frac{3}{4}$  inches; A90,  $6\frac{1}{2}$  inches; A91,  $7\frac{3}{4}$  inches; A93, M. C. Z. 29762,  $7\frac{1}{2}$  inches; A95,  $7\frac{1}{8}$  inches; A97, M. C. Z. 29763,  $7\frac{1}{4}$  inches, A102,  $6\frac{3}{8}$  inches long, and 29764,  $7\frac{1}{4}$  inches long from Tahaa, Society Islands. No. A167, 6 inches long from Taritari, Gilbert Islands. All of the Makemo and other A numbers have a very pale blue wash over the dusky margins of soft dorsal, anal, and caudal which does not quite reach edge of fins.

**Abudefduf saxatilis** (LINNÉ).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 285.

*Chactodon saxatilis* LINNÉ, Syst. Nat. ed. 10, 1758, p. 276.

*Glyphidodon saxatilis* GÜNTHER, Fische der Südsee, 1881, **7**, p. 229, taf. 126, fig. A

Seven specimens, each  $\frac{5}{8}$  inches long, from Lagoon at Fakarava, Paumotu Islands. These specimens are too small for positive identification, but they agree very closely with the descriptions of this species. The ground color of the body was probably light bluish; there are 4 cross bars; no pectoral spot and no black stripe on lobes of caudal. Six specimens, M. C. Z. 29518,  $\frac{43}{100}$  to  $\frac{5}{8}$  inches long from Makemo, Paumotu Islands.

Muzzel and base of caudal are light yellow.

**Abudefduf glaucus** (CUVIER & VALENCIENNES).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 286.

*Glyphisodon glaucus* CUV. & VAL., Hist. Nat. Poiss., 1830, **5**, p. 355 (475).

Seventy-eight specimens from the following localities in the Paumotu Islands: Nos. 05821, 25 specimens  $1\frac{3}{8}$  to  $2\frac{7}{8}$  inches long, and 05891, M. C. Z. 29445, two specimens 1 and  $1\frac{3}{8}$  inches long from Makatea; No. 05844, fifty specimens  $1\frac{43}{100}$  to  $3\frac{5}{8}$  inches long from Makemo; No. 05883,  $2\frac{3}{8}$  inches long from Fakarava.

**Abudefduf zonatus** (Cuvier & Valenciennes).

Jordan & Seale, Bull. U. S. Bur. Fish., 1906, **25**, p. 286.

*Glyphisodon zonatus* Cuv. & Val., Hist. Nat. Poiss., 1830, **5**, p. 361 (483).

One specimen, No. 08926,  $3\frac{1}{2}$  inches long from Jaluit, Marshall Islands.

**Abudefduf antjerius** (Kuhl & Van Hasslet).

*Glyphisodon antjerius* Kuhl & Van Hasslet, Cuvier & Valenciennes's, Hist. Nat. Poiss., 1830, **5**, p. 360 (481).

*Glyphisodon antjerius* Day, Fishes of India, 1877, p. 387, pl. 81, figs. 4, 5.

One specimen, No. 08912,  $1\frac{5}{8}$  inches long from Arhno Atoll, Marshall Islands. Dorsal XIII, 12; Anal II, 12.

This specimen lacks the median stripe on nape and forehead and the ocelli on base of dorsal. The band from dorsal above eye forward is much narrower than pupil, and is continued backward along base of dorsal in a series of interrupted spots; numerous small grayish spots on scaly base of dorsal; anal uniform in color.

**Abudefduf curacao** (Bloch).

*Chactodon curacao* Bloch, Ichth., 1787, **3**, p. 106 (79), taf. 212, fig. 1.

*Glyphisodon trifasciatus* Bleeker, Verh. Bat. Genoot., 1846-47, **21**, p. 19.

Eight specimens from Jaluit, Marshall Islands, as follows, Nos. 09087, 5 inches long, 09010, 4 inches long, 08964, M. C. Z. 29564,  $4\frac{1}{2}$  inches long, and five specimens,  $3\frac{3}{4}$  to  $4\frac{1}{4}$  inches long.

**Abudefduf sexfasciatus** (Lacépède).

*Labrus sexfasciatus* Lacépède, Hist. Nat. Poiss., 1802, **3**, p. 477, pl. 19, fig. 2.

*Glyphisodon coelestinus* Cuvier & Valenciennes, Hist. Nat. Poiss., 1830, **5**, p. 347 (464) pl. 135.

Five specimens (young)  $\frac{7}{8}$  to  $1\frac{1}{4}$  inches long, and 05859, 7 inches long, from Papeete, Tahiti, Society Islands, M. C. Z. 29511 (1 specimen). Ten specimens,  $\frac{14}{25}$  to  $1\frac{1}{8}$  inches long from Fakarava, Paumotu Islands, and one specimen, M. C. Z. 29469, 2 inches long from Makemo, Paumotu Islands.

All the small examples have 12 or 13 anal rays, but the large example

(05859) has dorsal XII, 1, 12; anal 10, the single anal spine has the appearance of two spines grown together. It has perhaps been broken and then grown together.

***Dascyllus aruanus* (LINNÉ).**

GÜNTHER, *Fische der Südsee*, 1881, **7**, p. 235, taf. 124, fig. B.

*Chaetodon aruanus* LINNÉ, *Syst. Nat.* ed. 10, 1758, p. 275.

No. 08861, M. C. Z. 29489, a specimen  $2\frac{1}{8}$  inches long from Jaluit, Marshall Islands. No. 05876, two specimens,  $1\frac{1}{4}$  and  $2\frac{3}{8}$  inches long from Fakarava, Paumotu Islands. One specimen,  $1\frac{1}{2}$  inches long from Papeete, Tahiti, Society Islands.

***Dascyllus trimaculatus* (RÜPPELL).**

CUVIER & VALENCIENNES, *Hist. Nat. Poiss.*, 1830, **5**, p. 330 (441). GÜNTHER, *Fische der Südsee*, 1881, **7**, p. 235.

*Pomacentrus trimaculatus* RÜPPELL, *Atlas*, 1828, p. 39, taf. 8, fig. 3.<sup>1</sup>

No. 08859,  $4\frac{3}{8}$  inches long from Jaluit, Marshall Islands. No. 09029, M. C. Z. 29397,  $1\frac{3}{8}$  inches long from Suva, Fiji Islands.

It is possible that *D. albisella* Gill from Hawaii is the same as this species. The white bar (which is the only character separating the species) in the Hawaiian specimens is quite large in the small examples (1 inch) and becomes gradually smaller in larger examples; in a 2-inch example it extends only half as far down on the body as in the small (1-inch) example; we have no larger specimens of *D. albisella*, but believe that as the fish becomes larger, the spots are smaller, and gradually disappear. In the specimen of *D. trimaculatus*  $4\frac{3}{4}$  inches long, the spot has almost entirely disappeared.

***Dascyllus pomacentroides*, sp. nov.**

*Plate 5, figur 1.*

Type No. 65812 U. S. N. M., (Field No. 08879),  $2\frac{1}{2}$  inches long from Tiritari, Gilbert Islands.

General form of a *Pomacentrus*.

<sup>1</sup>The name *Pomacentrus trimaculatus* Cuvier & Valenciennes (*Hist. Nat. Poiss.*, 1830, **5**, p. 320, (441)) is preoccupied by *Pomacentrus trimaculatus* Rüppell (1828). For the fish named *Pomacentrus trimaculatus* by Cuvier and Valenciennes we propose the name *Pomacentrus dorsomaculatus*.

Dorsal XII,  $11\frac{1}{2}$ ; anal II,  $11\frac{1}{2}$ ; scales 3-27- $8\frac{1}{2}$ , 14 pores in lateral line on left side and 18 on right; head 3.33; depth 2.13 in length without caudal; eye 2.72 in head; snout 4; outer teeth in both jaws much enlarged and conical; pre-orbital serrate.

Color, plain brown; all the fins brown except that the anal is dusky anteriorly and the upper and lower margins of caudal much darker than the middle rays.

***Chromis caeruleus* (CUVIER & VALENCIENNES).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 290.

*Heliases caeruleus* CUV. & VAL., Hist. Nat. Poiss., 1830, **5**, p. 372 (497).

No. 08880, twenty-one specimens,  $1\frac{1}{4}$  to  $2\frac{5}{8}$  inches long, from Taritari, Gilbert Islands. Some of these specimens appear to have a double row of teeth in the lower jaw in front, having two large prominently projecting teeth on each side of symphysis of lower jaw.

No. 08862, four specimens  $2\frac{1}{4}$  to  $2\frac{1}{2}$  inches long from Kusaie, Caroline Islands.

Nineteen specimens, M. C. Z. 29534,  $1\frac{1}{5}$  to  $2\frac{3}{8}$  inches long from Fakarava, Paumotu Islands.

These specimens agree better with Cuvier & Valenciennes's description of *C. lepisurus* than with *C. caeruleus*, but we follow Jordan & Seale, who make *C. lepisurus* a synonym of *C. caeruleus*.

**LABRIDAE.**

***Stethojulis strigiventer* (BENNETT).**

BLEEKER, Atlas Ichth., 1862, **1**, p. 131, tab. 43, fig. 1. GÜNTHER, Cat., 1862, **4**, p. 140.

*Julis strigiventer* BENNETT, Proc. Zool. Soc. Lond., 1832, p. 184.

One specimen, No. 08954,  $3\frac{3}{10}$  inches long from Wotje, Marshall Islands. No. 09096, and nine specimens 08905, M. C. Z. 29477, 1 to 2 inches long from Truk, Caroline Islands; No. 09089, eleven specimens,  $1\frac{1}{2}$  to  $2\frac{1}{4}$  inches long from Moen, Caroline Islands. No. 05892, M. C. Z. 29476, two specimens,  $1\frac{3}{8}$  and 2 inches long from Fakarava, Paumotu Islands.

Each one of No. 08905 has a small black spot on the base of caudal just

above lateral line, and one on the next to last ray in dorsal and in anal. In No. 09089 the same spots are present, except in one example  $2\frac{1}{4}$  inches long, which lacks the spot; in No. 08954 the spot is wanting; in No. 05892 all the spots are much larger than in the other examples, the spot on dorsal, in the smaller example, is situated on the base of the 10th ray and the membrane between 9th and 11th ray; on anal it is on base of next to last ray and the membrane in front of it to 9th ray; in the large example dorsal spot extends from 9th ray to last, not including 9th or last ray. These may be different species, but we can find no other tangible differences.

***Stethojulis casturi* GÜNTHER.**

Fische der Südsce, 1881, **7**, p. 255, taf. 141, fig. A.

*Stethojulis alborittata* BLEEKER, Atlas Ichth., 1862, **1**, p. 132, tab. 44, fig. 5.

One specimen, No. 08957, 4 inches long from Wotje, Marshall Islands. This specimen agrees with the figure given by Jordan and Seale, and confirms their conclusions in separating it from *S. alborittata* of Bonnatere.

***Stethojulis bandanensis* (BLEEKER).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 297, pl. 45, fig. 2.

*Julis bandanensis* BLEEKER, Nat. Tijds. Ned. Ind., 1851, **2**, p. 254.

Six specimens from the following localities in the Marshall Islands, Nos. 09036, three specimens  $3\frac{1}{4}$  to  $3\frac{3}{8}$  inches, and 09079, M. C. Z. 29482, 3 inches, from Arhno Atoll; Nos. 08955,  $3\frac{1}{5}$  inches long, and 08956,  $3\frac{1}{2}$  inches, Wotje. 08838, M. C. Z. 29462, 3 inches long from Funafuti, Ellice Islands.

***Halichoeres trimaculatus* (QUOY & GAIMARD).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 301.

*Julis trimaculata* QUOY & GAIMARD, Voy. Astrolabe. Zool., 1835, **3**, p. 705, pl. 20, fig. 2.

No. 05894, two specimens, each about  $2\frac{3}{4}$  inches long from Makemo, Paumotu Islands, and No. 05893, M. C. Z. 29508, two specimens, each about 2 inches long from Fakarava, Paumotu Islands.

***Julis pulcherrima* (GÜNTHER).**

Cat., 1862, **4**, p. 200.

No. A134, 9 inches long from Kambara, Fiji Islands.

Head 3.41 in length of body to base of caudal; depth 3.41; eye 6.1 in head; snout, including upper lip 3.22; ventral 1.35; pectoral 1.49; longest dorsal spine (1st) 1.41; dorsal IX, 12; A. III, 12; scales 6-78-27.

Color in alcohol, head reddish purplish; traces of bands running same as in *J. purpureum* in Jordan & Evermann's Hawaiian Report; these bands have a faint bluish tinge in alcohol; body brownish, darker on back, with small scattered white spots anteriorly, more crowded, larger and bluish white posteriorly, anteriorly no spots on side below pectoral fins, but some immediately under the pectoral, extending from dorsal to anal posteriorly; a dark brown blotch in membrane between first two dorsal spines; a row of spots running from dorsal forward on nape to above eye, a similar row below this extending from dorsal to middle of eye; the fin yellowish with faint brownish base; a bluish white spot ocellated with brown; at base of each spine and ray, except first spine and ray, a row of similar spots extending from head on each side of nape; fin above these spots thickly spotted with similar but smaller spots for about two-thirds of its height, these spots terminating above abruptly in a row of spots running the entire length of fin; a faint brownish broken narrow band extending from 3d spine to 3d ray; outer margin of fin bluish white with a thread-like inner margin of brown; anal yellowish with a purplish brown base, and a narrow bluish white margin, this margin bordered within by a thread-like purplish brown line; a white spot on second spine just above base, a comparatively large white spot, at base of 3d spine and at base of all the soft rays excepting the next to last ray, a row of bluish white marks and spots beginning on 3d spine just beyond these dots and about midway of height of fin, these markings being irregular semi-circular crescents and spots anteriorly, each one beginning on rays and extending on membranes of this character as far as 6th soft ray, thence continuing as irregular spots to end of fin; each one of these marks bordered with faint purplish brown; beyond these, a row of small ocelli with white centers and purplish brown outer rim; between 3d anal spine and 6th soft ray, these ocelli are much smaller than others; two on each membrane; caudal mostly yellow, with purplish brown base; pectoral similar to caudal; ventral slight purplish brown with pale blue outer rays.

Our specimen seems undoubtedly *Julis pulcherrima* of Günther, but it differs from specimens from the Hawaiian Islands identified as *J. pulcherrima*

by Jordan & Evermann, in having a larger eye and longer snout and also in minor color differences. The type of *J. pulcherrima* came from the South Pacific, the type of *J. gaimard* from Hawaiian Islands. There have been many so-called *J. pulcherrima* recorded from Hawaii by various collectors and very few have got any which they identified as *J. gaimard*. The stated differences are so slight that it is doubtful if the Hawaiian *J. gaimard* and *J. pulcherrima* are really distinct.

The color of our specimen agrees fairly well with that of Bleeker's *Coris formosa* in Atlas 1, tab. 19, fig. 3, but he states in his descriptions that *J. formosa* has more scales than *J. gaimardi*; the reverse is the case in the figures.

#### ***Thalassoma lunare* (LINNÉ).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 305.

*Labrus lunaris* LINNÉ, Syst. Nat. ed. 10, 1758, p. 283.

One specimen, No. 08960, 6¼ inches long from Jaluit, Marshall Islands.

Depth 3.76; head 3.54; eye 5.83; snout 3.04; dorsal VIII, 13; anal II, 11; scales 4-28-9.

Head naked except for a group of 3 small scales on each side of head just above opercles, partly on upper part of opercle.

Color in alcohol, head a dark purplish brown, with lighter bands running obliquely downward and backward across opercles to edge of gill opening; two light bands crossing lower jaw, one just in front of angle of mouth, the other a little further back; body brownish yellow; a large black blotch across caudal peduncle at base of caudal fin; the prolonged rays of the caudal dusky on their basal third; soft and spinous dorsal with a purplish brown base and broad pale margin; anal similar; pectoral purplish brown at base of upper ray and with oblong similarly colored spot on upper half of pectoral but not reaching the tip.

#### ***Thalassoma purpureum* (FORSKÅL).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 305.

*Scarus purpureus* FORSKÅL, Descript. Anim., 1775, p. 27.

One specimen, No. A105, 11½ inches long from Whitsunday Island, Pinaki, Paumotu Islands.



***Cheilinus digrammus* (LACÉPÈDE).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 309.

*Labrus digrammus* LACÉPÈDE, Hist. Nat. Poiss., 1802, **3**, p. 448, 517, 518, pl. 1, fig. 2.

*Cheilinus radiatus* BLEEKER, Atlas Ichth., 1862, **1**, p. 64, 68, tab. 26, fig. 1.

No. A171, a specimen  $6\frac{3}{4}$  inches long from Taritari, Gilbert Islands. No. 08952, M. C. Z. 29515, a specimen 5 inches long from Kusaie, Caroline Islands.

***Cheilinus undulatus* RÜPPELL.**

Neue Wirb. Fische, 1835, p. 20, taf. 6, fig. 2. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 309.

No. 08953, M. C. Z. 29380,  $4\frac{1}{4}$  inches long, from Kusaie, Caroline Islands. No. A163, 10 inches long from Taritari, Gilbert Islands. No. A16, 18 inches long from Rangiroa, Paumotu Islands. No. 08872,  $6\frac{4}{5}$  inches long from Suva, Fiji Islands.

No. 08872, M. C. Z. 29569, is in very bad condition and the identification is not certain.

The small example, No. 08953, from Kusaie is similar in color, general shape, and measurements to the fish figured by Günther in Südsee, pl. 133, fig. B, except that it has 10 spines. Ours gives the following counts; dorsal X, 9; anal III,  $8\frac{1}{2}$ ; scales 3-22-6.

In No. A163 the color is exactly like that in No. A16, except that it lacks the vermiculations of No. A16 at the axil and base of pectoral. It has dorsal IX, 10; anal III,  $8\frac{1}{2}$ ; scales 3-22-6; head 2.8 to base of caudal; depth 2.7; orbit 7; snout 2.3.

No. A16 gives the following measurements: head 2.8 to base of caudal; depth 2.75; orbit 8 in head; snout 2.3; dorsal X,  $10\frac{1}{2}$ ; anal III,  $8\frac{1}{2}$ ; scales 3-22-6; ventrals not reaching anal; maxillary not reaching orbit; the posterior edge of gape not reaching orbit by a distance equal to nearly the width of orbit; longest dorsal rays, when depressed, reaching slightly beyond origin of upper caudal rays, anal rays about equal in extent to dorsal rays; caudal rounded.

In alcohol there are narrow wavy pale bars and reticulations on the caudal, the edge of fin with broad pale margin; soft dorsal and anal similarly colored, but lacking the pale margins; spinous dorsal similarly colored, but the bars are narrower, and more numerous; 2 short irregular narrow broken purplish brown

bars from the eye backward; rest of head covered with narrow pale vermiculations and streaks.

Inasmuch as our two large specimens have 9 and 10 spines respectively and they do not otherwise differ, the genus *Thalliurus* based on 10 spines alone is therefore not tenable. Günther's figure of *C. chlorurus* is not the *C. chlorurus* figured by either Bloch or Bleeker, and differs in coloration and in having a rounded caudal.

***Cymolutes praetextatus* (QUOY & GAIMARD).**

DAY, Fishes of India, 1877, p. 409, pl. 90, fig. 1.

*Julis praetextatus* QUOY & GAIMARD, Voy. Astrolabe. Zool., 1835, 3, p. 712, pl. 15, fig. 4.

One specimen, No. 05897, 3 inches long from Namuka, Tonga Islands.

Dorsal IX, 13; anal III, 12; scales 75 in lateral line.

This specimen agrees exactly in fin formation with Quoy & Gaimard's description. The original color is now but faintly indicated, but what can be seen agrees with the figure given by Quoy & Gaimard, excepting that our specimen has a small black spot on upper edge of caudal peduncle at base of caudal fin. This spot is stated by Jordan & Evermann to be present in some specimens of *C. leclussi* from Hawaii. Our specimen also agrees fairly well with *C. praetextatus* given by Day. There is no indication in our specimen of the line under the eye and the broad shoulder band, as shown in Bleeker's figure in Atlas Ichth., 1, pl. 31, fig. 1.

**SCARIDAE.**

***Scarichthys caeruleopunctatus* (RÜPPELL).**

GÜNTHER, Fische der Südsee, 1909, 8, p. 300.

*Scarus (Calliodon) caeruleopunctatus* RÜPPELL, Neue Wirbe. Fische, 1835, p. 24, taf. 7, fig. 3.

Ten specimens from Tonga Islands at Vavau, as follows:—Nos. 05896, eight specimens,  $2\frac{5}{8}$  to  $5\frac{3}{4}$  inches long; 05895, M. C. Z. 29381,  $5\frac{3}{4}$  inches long, and A130, M. C. Z. 29383,  $5\frac{7}{8}$  inches long.

***Scarus brunneus* JENKINS.**

Bull. U. S. Fish Comm., 1900, 19, p. 59, fig. 16.

Nos. A133, M. C. Z. 29770,  $8\frac{1}{2}$  inches, and A135,  $8\frac{1}{2}$  inches long from Kambara, Fiji Islands. No. A192  $6\frac{1}{4}$  inches long from Jaluit, Marshall Islands.

No. A192 has one tooth on one side and two on other side of upper jaw; No. A133 has one tooth on right side and none on left side; No. A135 has one tooth on right side and one on left side.

We have compared our specimens with specimens of *S. brunneus*, *S. bataviensis*, *S. erythron*, and the type of *S. erythacus* and find that they differ in no way from *S. brunneus* except in a naturally larger eye in our specimens, which are smaller than those we had of *S. brunneus*.

***Scarus pulchellus* RÜPPELL.**

Neue Wirb. Fische, 1835, p. 25, taf. 8, fig. 3.

*Pseudoscarus pulchellus* BLEEKER, Atlas Ichth., 1862, 1, p. 20, 34, tab. 10, fig. 3. GÜNTHER, Cat., 1862, 4, p. 219.

No. A40, 14 inches long from Fakarava, Paumotu Islands.

Head 3.4 in length; eye 6.71 in head; snout 2.09; pectoral 1.3; dorsal IX, 10; anal III, 9.

General color in alcohol greenish gray, darker on the back; pectorals translucent yellowish; dorsal and anal with a narrow dark margin, that of the dorsal being darkest on spinous portion of fin; caudal with yellow membranes and greenish yellow rays and paler margin, the somewhat produced lobes a little darker than rest of fin.

Scales  $2\frac{1}{2}$ –24–6; interlobular margin somewhat rounded; 4 scales before the dorsal; 3 rows on cheek; no teeth at corner of mouth; teeth white; lips cover more than half the jaws.

This specimen agrees very well with *S. pulchellus* except the color, and this we cannot make out.

***Scarus bataviensis* BLEEKER.**

Nat. Tijds. Ned. Ind., 1857, 13, p. 342.

*Callyodon bataviensis* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 323, fig. 61.

*Pseudoscarus bataviensis* BLEEKER, Atlas Ichth., 1862, 1, tab. 12, fig. 3, p. 22, 48. GÜNTHER, Fische der Südsee, 1909, 8, p. 317.

Nos. A189, M. C. Z. 29777, and A190 from Jaluit, Marshall Islands.

The teeth in No. A189 are  $\frac{2}{3}$  on right side and  $\frac{1}{3}$  on left; in No. A190 they are  $\frac{1}{3}$  on right and  $\frac{2}{3}$  on left.

Regarding the color of these specimens it is like that described by Jordan & Seale, rather than that of Bleeker.

### EPHIPPIDAE.

#### *Platax orbicularis* (FORSKÅL).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 335.

*Chaetodon orbicularis* FORSKÅL, Descript. Anim., 1775, p. 59.

One specimen, No. 05890,  $1\frac{5}{8}$  inches long from Bora Bora, Society Islands.

### CHAETODONTIDAE.

#### *Forcipiger longirostris* (BROUSSONET).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 363, pl. 46.

*Chaetodon longirostris* BROUSSONET, Ichth. sist. Piscium, 1782, p. 23, pl. 7.

Plate 5, figure 2.

One specimen  $\frac{2}{3}$  inch long, taken at the surface off Fakarava, Paumotu Islands.

This is probably the *Tholichthys* stage of *F. longirostris* as shown by the great development of the armature on the head.

#### *Megaprotodon trifascialis* (QUOY & GAIMARD).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 336, pl. 50, fig. 1

*Chaetodon trifascialis* QUOY & GAIMARD, Voy. Uranie. Zool., 1825, p. 379, pl. 62, fig. 5.

No. 05885, a specimen  $1\frac{23}{30}$  inches long from Fakarava, Paumotu Islands.

#### *Chaetodon setifer* BLOCH.

Ichth., 1788, **6**, pl. 426, fig. 1. JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 364, pl. 47. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 338.

The collection contains the following specimens from Taritari, Gilbert Islands: Nos. A164,  $6\frac{3}{4}$  inches; A162, M. C. Z. 29746,  $4\frac{7}{8}$  inches; A174, M. C. Z. 29747,  $5\frac{3}{4}$  inches. From Makemo, Paumotu Islands, Nos. A76,  $5\frac{1}{4}$  inches; A79, M. C. Z. 29744,  $7\frac{3}{4}$  inches; A85,  $7\frac{3}{4}$  inches; A101, 7 inches and A104, M. C. Z. 29745, 7 inches. From Kusaie, Caroline Islands, No. 08808,  $2\frac{1}{2}$  inches long.

**Chaetodon ulietensis** CUVIER & VALENCIENNES.

Hist. Nat. Poiss., 1831, **7**, p. 30 (39). JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 340.

Nos. AS2, AS8, AS0 and 05889, four specimens 5 to  $5\frac{1}{2}$  inches long from Makemo, Paumotu Islands, and 05888, two specimens, each  $5\frac{5}{8}$  inches long from Rangiroa, Paumotu Islands.

This species is closely related to *C. falcula* of Bloch, from which according to Jordan & Seale "it is well distinguished." The figures of *C. falcula* of Bloch, Bleeker, and Day, have a somewhat different color pattern than that of *C. ulietensis*.

**Chaetodon lunula** (LACÉPÈDE).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 366, pl. 54, fig. 160.

*Pomacentrus lunula* LAC., Hist. Nat. Poiss., 1802, **4**, p. 507, 510, 513.

Nos. AS6, M. C. Z. 29750,  $6\frac{1}{4}$  inches, and AS9,  $6\frac{1}{2}$  inches long, from Makemo, Paumotu Islands. Four specimens, Nos. 09070, M. C. Z. 29501,  $\frac{3}{4}$  to  $\frac{7}{8}$  inches long, and 09068,  $\frac{5}{8}$  inches long from Arhno, and 09077,  $\frac{7}{8}$  inches long from Wotje, both in Marshall Islands.

**Chaetodon kleinii** BLOCH.

Ichth., 1787, **4**, p. 7, tab. 218, fig. 2, after Klein.

*Tetragonoptrus (Lepidochaetodon) kleini* BLEEKER, Atlas Ichth., 1877-78, **9**, p. 45, tab. 373, Chaet. 11, fig. 3.

Nos. 08858, four specimens,  $3\frac{1}{2}$  to 4 inches long, and 08963, M. C. Z. 29798,  $3\frac{3}{4}$  inches; 08962, M. C. Z. 29798, 3 inches; 08965,  $4\frac{1}{4}$  inches, from Jaluit, Marshall Islands.

**Chaetodon trifasciatus** MUNGO PARK.

Trans. Linn. Soc., 1797, **3**, p. 34. JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 372, pl. 52. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 344.

No. 08864, a specimen  $3\frac{3}{4}$  inches long from Suva, Fiji Islands.

## ZANCLIDAE.

*Zanclus canescens* (LINNÉ).

BLEEKER, Atlas Ichth. 1877-78, **9**, p. 77-78, tab. 366, Chaet., tab. 4, fig. 3. JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1905, **23**, pt. 1, p. 382, pl. 57. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 350.

*Chaetodon canescens* LINNÉ, Syst. Nat. ed. 10, 1758, p. 272.

No. A175, 6 inches long from Jaluit, Marshall Islands.

No. 08840, M. C. Z. 29790,  $2\frac{1}{2}$  inches long from Funafuti, Ellice Islands.

## TEUTHIDIDAE.

*Teuthis nigricans* (LINNÉ).

*Chaetodon nigricans* LINNÉ, Syst. Nat. ed. 10, 1758, p. 274.

*Hepatus nigricans* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 351.

No. 08873, a specimen  $5\frac{1}{4}$  inches long from Suva, Fiji Islands.

*Teuthis elongatus* (LACÉPÈDE).

?*Chaetodon elongatus* LACÉPÈDE, Hist. Nat. Poiss., 1802, **4**, p. 471, fig. 2.

*Acanthurus nigros* GÜNTHER, Cat., 1861, **3**, p. 332. Fische der Südsee, 1875, **4**, p. 110.

Two specimens from Truk, Caroline Islands, Nos. 09059,  $1\frac{1}{2}$  inches long, and 09052, M. C. Z. 29582,  $1\frac{23}{30}$  inches long. The last has the following measurements, dorsal IX,  $27\frac{1}{2}$ ; anal III,  $25\frac{1}{2}$ ; scales minute; 11 lobate teeth in each jaw; the ridges of the larval form are indicated on the cheek and on the throat. General color light purplish brown, a broad silvery area as wide as snout extending from belly to a little above pectoral; dorsal, ventral, and anal dusky; pectoral and caudal pale; trace of a yellowish band across base of caudal. Number 09059 seems to differ from the above only in the fin rays which are: dorsal IX, 26; anal III, 24.

Because of the small size of these specimens it is impossible to identify them, with certainty, but they agree more nearly with *Acanthurus nigros* Günther especially in the number of teeth and the fin formulae than with any other described species.

**Teuthis triostegus** (LINNÉ).

*Chaetodon triostegus* LINNÉ, Syst. Nat. ed. 10, 1758, p. 274.

*Acanthurus triostegus* GÜNTHER, Cat., 1861, 3, p. 327. DAY, Fishes of India, 1876, p. 204, pl. 48, fig. 2.

*Hepatus triostegus* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 354.

Nos. 05872,  $1\frac{1}{4}$  inches long from Fakarava, and 05924, M. C. Z. 29480, three specimens,  $1\frac{3}{8}$  to  $2\frac{1}{2}$  inches long from Makemo, each in Paumotu Islands. Nos. 08927,  $2\frac{1}{4}$  inches long from Jaluit, and 08910, M. C. Z. 29483,  $1\frac{3}{8}$  inches long from Arhno Atoll, each in Marshall Islands.

Jordan and Seale say: "this seems like *sandwichensis*, but lacks one cross-band and is very pale; only 4 bands on sides." Regarding *sandvicensis* they say, "This is the most abundant species of the genus about Hawaii, where it replaces the closely allied *H. triostegus*. The differences, although slight, are constant."

We have compared our specimens with a specimen of *sandvicensis* from Hawaii, and find the number of cross bands the same, the only difference being the somewhat darker color of the Hawaiian specimen and the continuation of the shoulder band downward and backward below the upper base of the pectoral, which is well shown in the figure given by Jordan & Evermann (Bull. U. S. Fish. Comm. 23, pt. 1, fig. 172). In our specimens the band does not extend below the pectoral, which character is well shown in Day's figure of *T. triostegus*.

Another specimen, No. 09072 (larval form)  $1\frac{1}{8}$  inches long from Arhno Atoll, Marshall Islands.

In color this specimen differs but slightly from *Teuthis elegans* Garman, Deep Sea Fishes, p. 70, pl. 50, fig. 2, the only differences being in the faint V-shaped mark on caudal peduncle, fainter dots at the base of the anal, none at base of the dorsal and a much darker end to the caudal. It differs in other respects as follows: the spines at the ends of alternate ridges at the bases of dorsal and anal are arranged in groups of 2-4 instead of 3-6; the second dorsal spine is equal to the distance from the posterior edge of the pupil to the tip of the snout, instead of equal to the eye and snout; and it has no denticles on the anterior edge, but merely presents a rough and irregular surface, where *T. elegans* is said to have about nine denticles, it is distinctly grooved on each side, with the appearance of two close-set spines, the posterior portion of which seems to be finely serrate on the sides; and the margin of the spinous dorsal instead of hav-

ing an even curve with the margin of the soft dorsal from the tip of the second spine, is slightly falcate; a condition due to the second spine exceeding the third in length, it being about .2 longer; the second spine of the anal is similar to the 2nd spine of the dorsal and has 9 or 10 denticles about the middle of its anterior edge; dorsal IX, 23 instead of IX, 22; anal III, 20, instead of III, 21.

***Teuthis guttatus* (BLOCH & SCHNEIDER).**

*Acanthurus guttatus* BLOCH & SCHNEIDER, Syst. Ichth., 1801, p. 215.

*Hepatus guttatus* JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 392, fig. 170. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 354.

No. A160, 9 inches, and A161, M. C. Z. 29755,  $8\frac{1}{2}$  inches long from Tiritari, Gilbert Islands, Nos. A47, 7 inches long, and A48, M. C. Z. 29756,  $7\frac{1}{2}$  inches long, from Fakarava, Paumotu Islands.

***Teuthis mata* (CUVIER & VALENCIENNES).**

*Acanthurus mata* CUV. & VAL., Hist. Nat. Poiss., 1835, **10**, p. 148 (202). DAY, Fishes of India, 1876, p. 205, pl. 48, fig. 1.

No. A24, M. C. Z. 29736,  $11\frac{5}{8}$  inches long from Rangiroa, Paumotu Islands.

This specimen has the head 4 in length; depth 2.18; eye 4.44 in head; snout 1.87; preorbital 2.30; pectoral 1.74 in depth; dorsal IX, 25; anal III, 23; 9 teeth on each side in upper jaw.

No. A38, a specimen  $12\frac{1}{4}$  inches long from Fakarava, Paumotu Islands.

This specimen has the head 3.81 in length; depth 2.25; eye 4.2 in head; snout 1.97; preorbital 2.42; pectoral 1.73 in depth; dorsal IX, 25; anal III,  $23\frac{1}{2}$ ; 10 teeth on each side in upper jaw.

Tail when spread has the inner portion truncate and the outer rays produced, somewhat lunate when not spread; length of the head about equal to its depth in a line through the middle of the eye.

Color dark brown, with numerous narrow, wavy, longitudinal, bluish stripes, these alike on head and body; they meet on the front profile of the head; breast with coarser stripes; pectoral brown, grading into a pale bluish terminal margin, into which the brown of the rays continue; caudal, anal, and dorsal dark brown, dorsal and anal with a darker margin; ventrals brown.



**Ctenochaetus striatus** (QUOY & GAIMARD).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 398, fig. 174. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 354.

*Acanthurus striatus* QUOY & GAIMARD, Voy Uranie, Zool., 1825, p. 373, pl. 63, fig. 3.

No. 05925, two specimens, each  $2\frac{1}{8}$  inches long from Papeete, Tahiti, Society Islands.

**Zebrasoma rhombeum** (KITTLITZ).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 355.

*Acanthurus rhombeus* KITTLITZ, Senckenberg Mus., 1834, **1**, p. 196, pl. 13, fig. 16.

Nos. A109,  $7\frac{3}{8}$  inches; A113, M. C. Z. 29749,  $6\frac{1}{2}$  inches and A114,  $6\frac{1}{2}$  inches long from Tahaa, Society Islands.

Jordan & Seale suggest the possibility of the two forms *Z. flavescens* and *Z. rhombeum* being color variations of one diacromatic species.

**Zebrasoma veliferum** (BLOCH).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 396, fig. 173. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 356.

*Acanthurus velifer* BLOCH, Ichth., 1793, **9**, p. 106, taf. 427, fig. 1.

Nos. A110,  $9\frac{7}{10}$  inches; A111, 9 inches and A112, M. C. Z. 29739,  $9\frac{1}{4}$  inches long from Tahaa, Society Islands.

**Acanthurus brevirostris** (CUVIER & VALENCIENNES).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, p. 401, fig. 176.

*Nasus brevirostris* CUV. & VAL., Hist. Nat. Poiss., 1835, **10**, p. 204 (277), pl. 291. GÜNTHER, Fische der Südsee, 1875, **4**, p. 121, taf. 79, fig. A, text fig. 5.

No. A18, M. C. Z. 29738, female,  $11\frac{3}{4}$  inches long from Rangiroa, Paumotu Islands. This specimen has head 4.36 in length; depth 2.54; eye 4 in head; distance from front of eye to tip of horn 4.51 in length; eye to tip of upper lip, 1.76 in head; dorsal VI, 27; anal II, 29.

No. A15, a female specimen, 12 inches long, from Rangiroa, Paumotu Islands. This specimen has head 4.54 in length; depth 2.65; eye 4 in head; distance from front of eye to tip of horn 4.06 in length; eye to tip of upper lip 1.64 in head; dorsal VI, 26; anal II, 28.

No. A23, a male specimen,  $12\frac{1}{2}$  inches long, from Rangiroa, Paumotu Islands. This specimen has head 4.6 in length; depth 2.67; eye 4 in head; distance from front of eye to tip of horn 3.2 in length; eye to tip of upper lip 1.6 in head; dorsal VI, 28; anal II, 29.

No. A23 is a male and has the snout much longer than the other specimens, its length measured from underneath is  $2\frac{1}{2}$  inches long and just equals length of head; the two spines on each side of the caudal peduncle are longer than those in the other specimens, and are close together; their distance apart being less than their height; they are broad, sharp and hooked forward, the posterior one the larger; its height measured on the anterior edge is slightly less than its base; soft dorsal and anal, when depressed, reach the bases of upper and lower caudal rays respectively; caudal truncate.

Ground color, a dark brown on back, graduated to a lighter brown on side and belly; horn marked by narrow longitudinal dusky stripes; cheeks, pre-orbital, and preopercle covered with small round dark spots; opercle with round dark spots on its upper part, becoming oblong and line-like on lower portion; opercular membrane or flap creamy white; back thickly covered with very small round dusky spots, becoming slightly vertical, oblong in the region of lateral line, and increasing in length on the sides, anteriorly forming linear oblong spots, and on the middle of the body narrow vertical bands; just anterior to caudal spines the spots are round; these markings reach a horizontal line extending from the lower base of the pectoral posteriorly, to about the beginning of the posterior 4th of the base of the soft anal; base of caudal spotted; dorsal and anal plain light brown, the membrane of spinous portion shows traces of a narrow black margin; pectoral light brown, with indication of a lighter margin; caudal greenish yellow, with a dark grayish brown terminal margin; breast, throat, and abdominal region, plain light brown, showing traces of a few very small dusky darker spots just below pectoral.

Nos. A15 and A18, both females. The horn of A15, measured from below, is 1.56 inches long and is 1.5 in head; the horn of A18 is 1.37 inches long and is 1.71 in head. The spines on caudal peduncle of A15 are smaller and farther apart than in A23; their distance apart being much greater than their height or the length of their base; the spines are rounded and not triangular as in A23, and about half as high as length of base; slightly inclined forward, but not

hooked. The spines in A18 are the same as in A15, but their bases are a little closer together, the distance between them being about equal to base of 1st spine. The horn of A15 is much more slender than that in A18; caudal slightly emarginate.

These specimens have been badly preserved and the original color cannot be made out, but they are now brown, showing no traces of spots or lines; except on base of caudal of A15; there are traces of longitudinal stripes on the horns; opercular flap yellow; fins similar in color to A23.

While the horns of these specimens are longer than the dimensions given in current descriptions they, as well as the descriptions, show a wide variation in that character; and since they agree so well in other respects, and inasmuch as this variation seems dependent upon age, size, and sex, we believe them to be *A. brevisrostris*.

***Acanthurus vlamingi* (CUVIER & VALENCIENNES).**

*Nasus vlamingi* Cuv. & Val., Hist. Nat. Poiss., 1835, **10**, p. 216 (293).

*Nasus vlamingii* GÜNTHER, Fische der Südsee, 1875, **4**, p. 123, taf. 81.

No. A21, 15 inches long from Rangiroa, Paumotu Islands.

**SIGANIDAE.**

***Siganus fuscescens* (HOULTUYN).**

EVERMANN & SEALE, Bull. U. S. Bur. Fish., 1907, **26**, p. 98.

*Centroqaster fuscescens* HOULTUYN, Verh. Holl. Maat. Weet. Haarlem, 1782, **20**, p. 333.

Nos. 08811,  $5\frac{1}{2}$  inches; 08812,  $5\frac{3}{4}$  inches, and 08813, M. C. Z. 29783,  $5\frac{1}{4}$  inches long from Kusaie, Caroline Islands.

These specimens are in very poor condition.

***Siganus punctatus* (BLOCH & SCHNEIDER).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 360.

*Amphacanthus punctatus* BLOCH & SCHNEIDER, Syst. Ichth., 1801, p. 210.

No. A65, a specimen  $13\frac{1}{2}$  inches long from Makemo, Paumotu Islands.

This specimen has head 4.66 in length; depth 2.45; eye 4 in head; snout 2.4; pectoral 1.12; dorsal XII, 10; anal VII, 9.

No. A182, M. C. Z. 29753, a specimen  $12\frac{1}{4}$  inches long from Arhno, Marshall Islands.

This specimen has head 4.62 in length; depth 2.5; eye 4.07; snout 2.4; pectoral 1.23; dorsal XIII, 10; anal VII, 10.

In each the caudal is deeply lunate when spread, otherwise it appears deeply forked.

Color of No. A65, head and body rather dark brown, showing faint traces of the spotted or reticulated effect, like that in Günther's figure of *Teuthis rostrata* (Fische der Südsee, taf. 60); pectorals yellow; ventrals gray, barred with brown; spinous dorsal gray, mottled with brown, spinous anal same; soft dorsal and anal have a translucent membrane, and rays barred with brown; caudal brown, grading into a mottled greenish gray terminal margin. Other specimens are colored in the same way, but show no mottling on caudal margin.

We follow Jordan & Seale in identifying this fish as *S. punctatus*, which from descriptions seems to differ from *S. rostratus* in no way except in depth of body.

***Siganus rostratus* (CUVIER & VALENCIENNES).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 360.

*Amphacanthus rostratus* CUV. & VAL., Hist. Nat. Poiss., 1835, **10**, p. 116 (158).

*Teuthis rostrata* GÜNTHER, Fische der Südsee, 1874, **3**, p. 89, taf. 60.

One specimen, No. 09032, 2 inches long from Suva, Fiji Islands.

**SCORPAENIDAE.**

***Sebastopsis scabra* (RAMSAY & OGILBY).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 374, fig. 71.

*Sebastes scabra* RAMSAY & OGILBY, Proc. Linn. Soc. N. S. Wales, 1885, **10**, p. 577.

No. 05935, a specimen  $1\frac{3}{4}$  inches long from Bora Bora, Society Islands.

No. 08943, a specimen, M. C. Z. 29468,  $2\frac{1}{2}$  inches long from Kusaie, Caroline Islands.

***Scorpaenopsis laotale* (JORDAN & SEALE).**

*Sebastapistes laotale* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 376, fig. 72.

One specimen, No. 05918,  $1\frac{1}{2}$  inches long from Makemo, Paumotu Islands.

Although Jordan & Seale include this species in *Sebastapistes*, they state that it has no palatine teeth. The presence of palatine teeth is one of the generic characteristics of *Sebastapistes*. Jordan & Seale make the *Scorpaena tristis* of Günther's Südsee a synonym of *Sebastapistes laotale* notwithstanding that Günther says it has palatine teeth. We therefore transfer it to *Scorpaenopsis*.

***Sebastapistes galactacme* JENKINS.**

Bull. U. S. Fish. Comm., 1904, **22**, p. 496, fig. 40. JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 459, fig. 201. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 376, name only.

One specimen (poor condition), No. 05937,  $1\frac{3}{4}$  inches long from Suva, Fiji Islands.

The specimen has no supraorbital cirrus, but one of the two cotypes of Jenkins had none, while the other had a conspicuous one. In other respects it agrees very well with the description given by Jenkins.

***Sebastapistes tristis* (KLUNZINGER).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 377.

*Scorpaena tristis* KLUNZINGER, Synopsis Fische Rothen Meeres, 1870, p. 802.

No. 05936, a specimen  $2\frac{3}{8}$  inches long from Bora Bora, Society Islands.

***Pterois volitans* (LINNÉ).**

CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1829, **4**, p. 258 (352), pl. 88. GÜNTHER, Fische der Südsee, 1874, **3**, p. 81.

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 379.

*Gasterosteus volitans* LINNÉ, Syst. Nat. Ed. 10, 1758, p. 296.

One specimen 11 inches long from Jaluit, Marshall Islands.

***Pterois radiata* CUVIER & VALENCIENNES.**

Hist. Nat. Poiss., 1829, **4**, p. 275 (369). GÜNTHER, Fische der Südsee, 1874, **3**, p. 81, taf. 56, fig. A.

One specimen No. 05927, 4 inches long from Fakarava, Paumotu Islands.

***Pterois antennata* (BLOCH).**

GÜNTHER, Cat., 1860, **2**, p. 124.

*Scorpaena antennata* BLOCH, Ausl. Fische, 1788, **6**, p. 16, taf. 185.

Two specimens, No. 05931,  $2\frac{1}{2}$  and  $3\frac{3}{4}$  inches long from Makatea, Paumotu Islands. M. C. Z. 29519 (1 specimen).

**Synanceja verrucosa** BLOCH & SCHNEIDER.

Syst. Ichth., 1801, p. 195, tab. 45. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 379.

Two specimens, No. A194, M. C. Z. 29754, 9 and  $9\frac{1}{2}$  inches, respectively, from Jaluit, Marshall Islands.

**CARACANTHIDAE.****Caracanthus maculatus** (GRAY).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 453, fig. 198.

*Micropus maculatus* GRAY, Zool. Misc., 1831, p. 20.

No. 05934, a specimen  $1\frac{1}{2}$  inches long from Rangiroa, Paumotu Islands.

**Amphiprionichthys unipinna** (GRAY).

*Micropus unipinna* GRAY, Zool. Misc., 1831, p. 20.

*Caracanthus unipinna*, JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 454.

No. 05932, four specimens,  $\frac{7}{8}$  to  $1\frac{1}{8}$  inches long, from Makemo, Paumotu Islands. M. C. Z. 29399 (2 specimens).

**GOBIIDAE.****Ophiocara porocephala** (CUVIER & VALENCIENNES).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 384; 1908, **27**, p. 274.

*Eleotris porocephala* CUV. & VAL., Hist. Nat. Poiss., 1837, **12**, p. 178.

*Eleotris ophiocephalus* KÜHL & VAN HASSELT, CUV. & VAL'S. Hist. Nat. Poiss., 1837, **12**, p. 180 (239).

*Eleotris ophiocephalus* GÜNTHER, Fische der Südsee, 1877, **6**, p. 185, taf. 112, fig. A.

One specimen, No. 08801,  $5\frac{7}{8}$  inches long from Kusaie, Caroline Islands.

Head 3 in length; eye 6 in head; snout 3.2; dorsal VI-I, 9; anal I, 8; scales 34, 22 in front of dorsal.

One specimen, No. 08988, M. C. Z. 29392,  $3\frac{5}{8}$  inches long from Kusaie, Caroline Islands.

Head 2.9 in length; eye 4.5 in head; snout 3.33; dorsal VI-I, 9; anal I, 8; scales 33.

Two specimens,  $10\frac{1}{4}$  and  $11\frac{1}{2}$  inches long from Kusaie, Caroline Islands. The smaller specimen has dorsal VI, 1,  $8\frac{1}{2}$ ; anal, I,  $7\frac{1}{2}$ ; scales from origin of

dorsal to anal 11, from upper end of gill opening to last large scale 35, from front of dorsal to line on middle of eye 15; maxillary reaches line on middle of eye. The larger specimen agrees in all the above counts and is similar in color in all respects, both agreeing with Günther's figure and description, but not with that of Day; it is more like Day's figure of *O. porocephalus* in coloration and size of mouth; Günther includes *O. porocephalus* of Cuv. & Val. in his synonymy of *O. ophiocephalus* in which he is probably correct. M. C. Z. 29784, Kusaie, Caroline Islands (1 specimen).

***Asterropterix semipunctatus* RÜPPELL.**

*Asterropterix semipunctatus* RÜPPELL, Atlas, 1828, p. 139, taf. 34, fig. 4. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 385, pl. 36, fig. 1.

*Elcotris semipunctata* GÜNTHER, Fische der Südsee, 1877, **6**, p. 187, taf. 111, fig. D.

One specimen, No. 05920,  $1\frac{3}{8}$  inches long from Fakarava, Paumotu Islands.

***Eviota zonura* JORDAN & SEALE.**

Bull. U. S. Bur. Fish., 1906, **25**, p. 386, fig. 75.

The collection contains the following from the Paumotu Islands: two specimens, M. C. Z. 29379, each about  $\frac{4}{5}$  inches long from Fakarava; two specimens,  $\frac{23}{50}$  and  $\frac{5}{8}$  inch long from Rangiroa and one specimen,  $\frac{23}{50}$  inch long from Makemo.

***Periophthalmus barbarus* (LINNÉ).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 393.

*Gobius barbarus* LINNÉ, Syst. Nat. ed. 12, 1766, p. 150.

Nos. 09098, a specimen  $4\frac{1}{2}$  inches long and 09099,  $4\frac{1}{8}$  inches long from Moen, Truk Group, Caroline Islands. No. 05910, M. C. Z. 29521,  $2\frac{1}{4}$  inches long from Suva, Fiji Islands.

***Oplopomus oplopomus* (CUVIER & VALENCIENNES).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 396.

*Gobius oplopomus* CUV. & VAL., Hist. Nat. Poiss., 1837, **12**, p. 50 (66). GÜNTHER, Fische der Südsee, 1877, **6**, p. 170, taf. 110, fig. B.

One specimen, No. 09060,  $2\frac{1}{4}$  inches long, from Moen, Truk Group, Caroline Islands.

D. VI, I, 10; anal I, 10.

This agrees very well with Günther's description and figure of this species. It is, however, a little more slender, and has one more dorsal ray than Günther gives in his description, but the same number as shown in his figure. This species resembles *O. vergens* Jordan & Seale in having a more slender body and distinct lateral spots, but differs from *O. vergens* in having a larger eye; two conspicuous canine teeth on the lower jaw and produced spinous rays in the first dorsal fin.

***Ruppellia echinocephalus* (RÜPPELL).**

*Gobius echinocephalus* RÜPPELL, Atlas, 1828, p. 136. CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1837, **12**, p. 101 (134). KLUNZINGER, Fische Rothen Meeres, 1870, p. 475. GÜNTHER, Fische der Südsee, 1877, **6**, p. 175, taf. 108, fig. D.

*Gobius amicicus* CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1837, **12**, p. 102 (133).

*Paragobiodon echinocephalus*, JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 397.

Twelve specimens, No. 05913,  $\frac{5}{8}$  to  $1\frac{1}{8}$  inches long from Makemo, Paumotu Islands.

Color in alcohol, body very dark brown; dorsal, pectoral, anal, and caudal almost black; ventrals pale; head in most specimens abruptly lighter brown.

Five specimens, No. 05914, M. C. Z. 29465,  $\frac{7}{8}$  to  $1\frac{1}{8}$  inches long, from Vavau, Tonga Islands.

The three smallest specimens are similarly colored, but somewhat lighter than those from Makemo. The two largest are uniformly light brown all over.

Two specimens  $\frac{3}{8}$  and  $\frac{23}{30}$  inches long from Rangiroa, Paumotu Islands.

Body dark brown, head abruptly light brown; dorsal, anal, and caudal almost black, with punctulated lighter margins; pectoral pale with fine punctulations; ventrals pale.

One specimen, No. 05915,  $\frac{4}{5}$  inches long from Bora Bora, Society Islands. Similar in color to those from Makemo.

***Ruppellia lacunicola*, sp. nov.**

*Plate 6, figure 1.*

Type, No. 66006, U. S. N. M.,  $\frac{7}{8}$  inch long from Lagoon at Fakarava, Paumotu Islands.



Head 3; depth 3.27; eye 4; dorsal VI-10 $\frac{1}{2}$ ; anal 10; 22 scales in longitudinal series.

Color in alcohol, uniform dark straw. All the fins except the ventrals brownish black; ventrals very pale reddish brown. This species is close to *P. echinocephalus* from which it differs in coloration, in being less elongate, having smaller canines, coarser and fewer flaps, and practically no hair-like papillae on head.

**Zonogobius semidoliatus** (CUVIER & VALENCIENNES).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 397, fig. 86.

*Gobius semidoliatus* CUV. & VAL., Hist. Nat. Poiss., 1837, **12**, p. 51.

Two specimens, No. 05921,  $\frac{3}{4}$  and  $\frac{4}{5}$  inches long from Bora Bora, Society Islands. M. C. Z. 29593 (1 specimen).

**Vallima stevensoni** JORDAN & SEALE.

Bull. U. S. Bur. Fish., 1906, **25**, p. 398, fig. 87.

One specimen, 2 $\frac{1}{8}$  inches long from Tipaerui Valley, Papeete, Society Islands.

**Gobius ornatus** RÜPPELL.

Atlas, 1828, p. 135. GÜNTHER, Fische der Südsee, 1877, **6**, p. 172, taf. 3, fig. A. DAY, Fishes of India, 1876, p. 294, pl. 63, fig. 1. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 401, fig. 91.

Nos. 08901, M. C. Z. 29530, five specimens,  $\frac{5}{8}$  to 1 $\frac{3}{8}$  inches, and 09057, three specimens 1 $\frac{1}{2}$  to 2 $\frac{3}{8}$  inches long from Moen, Truk Group, Caroline Islands.

No. 08938, M. C. Z. 29491 one specimen, 2 $\frac{3}{4}$  inches long from Tonga Islands.

Two specimens, No. 09088, each 1 $\frac{1}{8}$  inches long from Moen, Truk Group, Caroline Islands.

One specimen, No. 09033, M. C. Z. 29493, 1 $\frac{1}{2}$  inches long from Suva, Fiji Islands.

The two small specimens from Moen resemble in every way the specimens of same size from Suva except in having a longer and slightly more humped snout. The large one differs in the same way, but has in addition a more slender caudal peduncle and the white markings are not definite.

**Mapo fuscus** (RÜPPELL).

JORDAN & EVERMANN, Bull. U. S. Fish Comm., 1905, **23**, pt. 1, p. 483, fig. 212. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 402.

*Gobius fuscus* RÜPPELL, Atlas, 1828, p. 137.

*Gobius albopunctatus* CUVIER & VALENCIENNES, Hist. Nat. Poiss., 1837, **12**, p. 57.

No. 05908, five specimens  $1\frac{7}{8}$  to 3 inches long from Rangiroa; one specimen  $1\frac{3}{4}$  inches long and Nos. 05919, 05912,  $2\frac{1}{2}$  inches and  $1\frac{3}{4}$  inches long from Makemo, both places in Paumotu Islands. No. 09051, M. C. Z. 29526,  $1\frac{3}{4}$  inches long from Vavau, Tonga Islands. No. 08944, M. C. Z. 29481, 3 inches long from Kusaie, Caroline Islands. Nos. 08939, M. C. Z. 29504, two specimens  $1\frac{3}{4}$  and 2 inches long from Tonga Islands and 08913,  $1\frac{3}{4}$  inches long from Arhmo Atoll, Marshall Islands.

**Glossogobius biocellatus** (CUVIER & VALENCIENNES).

*Gobius biocellatus* CUV. & VAL., Hist. Nat. Poiss., 1837, **12**, p. 57 (74). DAY, Fishes of India, 1876, p. 289, pl. 63, fig. 8.

One specimen, 1 inch long from Makemo, Paumotu Islands. This specimen is too small for positive identification, but it is provisionally identified with *G. biocellatus*, since it agrees very well in all the characters given, except in coloration. It has dorsal VI-I, 9; A. I, 9 (Cuv. & Val. give D. VI, I, 10; A. I, 9); scales at least 27; tongue notched; head naked; it agrees perfectly with Day's description of teeth.

Color in alcohol, pale, slight traces of large brownish spots on sides and narrow bar across base of caudal; group of large punctulations anteriorly at base of spinous dorsal, other smaller groups near end of rays indicating possible bands, but the membrane is torn and the spines are separated somewhat. A few punctulations in longitudinal series on the middle of the rays of the soft dorsal.

**Awaous genivittatus** (CUVIER & VALENCIENNES).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 492, fig. 218.

*Gobius genivittatus* CUV. & VAL., Hist. Nat. Poiss., 1837, **12**, p. 64. GÜNTHER, Fische der Südsee, 1877, **6**, p. 170, taf. 110, fig. C.

One specimen, No. 08989,  $3\frac{1}{2}$  inches long from Kusaie, Caroline Islands.

**Amblygobius phalaena** (CUVIER & VALENCIENNES).

JORDAN & RICHARDSON, Bull. U. S. Bur. Fish., 1908, **27**, p. 278.

*Gobius phalaena* CUV. & VAL., Hist. Nat. Poiss., 1837, **12**, p. 70 (92). GÜNTHER, Cat., 1861, **3**, p. 67.

One specimen, No. 09096,  $1\frac{1}{3}$  inches long from Vavau, Tonga Islands.

Dorsal VI — 15; Anal 15; scales in lateral series 52.

This specimen agrees quite well with the descriptions of this species, differing, however, in the following points: instead of three rows of spots on the sides of the head there is a brownish band bordered by narrow marginal bands of light gray; 18 scales in longitudinal series between the 2nd dorsal and the anal instead of 16.

The specimen has, as mentioned in Günther's description of a young example, a single black spot in the upper part of the base of caudal; the pectoral fins are too badly torn to be certain as to their color pattern.

**Amblygobius sphinx** (CUVIER & VALENCIENNES).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 406.

*Gobius sphinx* CUV. & VAL., Hist. Nat. Poiss., 1837, **12**, p. 70 (93). GÜNTHER, Cat., 1861, **3**, p. 67.

One specimen, No. 09085,  $1\frac{1}{3}$  inches long from Moen, Truk Group, Caroline Islands.

Head 3.22 in length; depth 3.86; eye 3.6 in head; snout 4.5; interorbital 5.62; maxillary 2.57; longest ventral ray 1.63; pectoral ray 1.12; scales 54, 18 in transverse series; dorsal VI, 15; anal 14.

Color (faded) in spirits, brown, there are about 5 darker brown cross bars; back with pale mottlings; a series of cross streaks from lateral line to belly, one in front of pectoral, 4 or 5 behind pectoral; posterior to these from lateral line across ventral region, a series of 4 pairs of light brown narrow bars; first pair near vent, second posterior to origin of anal, third under posterior part of anal, fourth on caudal peduncle; a faint spot on middle of opercle; a small black spot on upper angle of opercle; a dusky bar across posterior margin of gill membrane, also a brown spot on each side of the isthmus (chin) close to the symphysis; numerous small pearly white spots on cheeks and opercles; a dark brown spot on shoulder just back of opercular spot; a small white-edged black

ocellus at base of caudal immediately above lateral line; the indistinct clouded effect on the back corresponds to pairs of bars on the belly; some black on both dorsals, too badly torn to determine pattern; ventrals and anals slightly dusky.

**Gobiodon histrio** (KÜHL & VAN HASSLET).

GÜNTHER, Cat., 1861, **3**, p. 88.

*Gobius histrio* KÜHL & VAN HASSLET, CUVIER & VALENCIENNES'S, Hist. Nat. Poiss., 1837, **12**, p. 100, (132), pl. 347, lower fig.

Eight specimens, part of No. 05918, 1 to  $1\frac{1}{2}$  inches long from Fakarava, Paumotu Islands, M. C. Z. 29524 (4 specimens).

Description of largest specimen: Dorsal VI, 11; anal 10; head 3.36 in body; depth 2.61; depth of head in head .9; eye 4.75; maxillary reaching very slightly, if any, beyond a line from front margin of orbit, not from the pupil; body strongly compressed; profile rounded.

Colors, dark brown with lighter head and breast somewhat darker fins.

These specimens have the general shape of *G. atrangulatus* but with a smaller mouth; they also have the general shape of Günther's figure in Fische der Südsee of *G. ceramensis*, but in our specimens the dorsals are united. Structurally they agree better with the description in Cuvier & Valenciennes of *G. histrio* than with any other described species, except that there are no tubercles on the head; since, however, these specimens do not now agree in color, we provisionally refer them to *G. histrio*.

**Gobiodon atrangulatus** GARMAN.

Bull. Mus. Comp. Zool., 1903, **39**, p. 234, pl. 2, fig. 2.

Five specimens, No. 05918 — part,  $\frac{2}{3}$  to  $1\frac{1}{8}$  inches long from Fakarava, Paumotu Islands. M. C. Z. 29378 (2 specimens).

Description of largest specimens, Dorsal VI, 11; anal 10; head 3.5 in body; depth 2.72; depth of head in head .97; eye 3.5; maxillary extending to below middle of the eye; mouth larger than in *G. rivulatus*. Color, the two largest specimens similar in color being light brown with bluish tint in reflected light and thickly sprinkled with fine darker punctulations; vertical fins somewhat dusky; near the tip of each dorsal spine is a small black spot indicating that it

may have had a narrow submarginal border. The three smallest specimens are uniformly plain straw color.

**Gobiodon rivulatus** (RÜPPEL).

GÜNTHER, Cat., 1831, **3**, p. 87. Fische der Südsee, 1877, **6**, p. 180, taf. 109, fig. F.

*Gobius rivulatus* RÜPPEL, Atlas, 1828, p. 136. Neue Wirb. Fische, 1835, p. 138.

Two specimens, No. 05916,  $\frac{7}{8}$  to  $1\frac{1}{4}$  inches long from Fakarava, Paumotu Islands. M. C. Z. 29592 (1 specimen).

Measurements of larger examples; Depth of head in length of head 1.41; head 2 in body; depth 1.92; eye 6.25 in head; maxillary reaches to below anterior edge of pupil; dorsal VI, 11; anal 9. Color plain light yellowish brown; fins paler.

These specimens agree in form with Günther's figure in Fische der Südsee, taf. 109, fig. F.

**Gobiodon citrinus** (RÜPPEL).

GÜNTHER, Fische der Südsee, 1877, **6**, p. 181, taf. 109, fig. E.

*Gobius citrinus* RÜPPEL, Neue Wirb. Fische, 1835, p. 139, taf. 32, fig. 4.

One specimen, No. 05917,  $1\frac{1}{2}$  inches long from Vavau, Tonga Islands.

One specimen, M. C. Z. 29460, No. 08945,  $1\frac{3}{4}$  inches long, from Kusaie, Caroline Islands.

**Sicyopterus taeniurus** (GÜNTHER).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 410.

*Sicydium taeniurum* GÜNTHER, Fische der Südsee, 1877, **6**, p. 183, taf. 112, fig. C.

Four specimens, No. 05902,  $2\frac{1}{2}$  to  $4\frac{1}{2}$  inches long from Fataua River, Tahiti, Society Islands. M. C. Z. 29472 (2 specimens).

The largest specimen gives the following measurements: Head 4.5 in length; eye 2.25 in interorbital; interorbital 2.5 in head; eye 5.71 in head; dorsal VI, 12, anal 10. Produced dorsal rays reaching a little beyond base of caudal; last anal rays barely reaching base of caudal; middle rays of pectoral 17 mm.; longest dorsal spine 33 mm.; length of head 20 mm.; scales 50. Color: ground color dark brown; caudal peduncle and caudal lighter with darker center, and darker outer margins; dark shade from back of eye towards corner of mouth.

**PARAGOBIOIDES**, gen. nov.

Type *P. grandoculis*, sp. nov.

Similar to *Gobioides* but with very large eyes. The ventral fins apparently separate, but it is uncertain if the division is normal.

***Paragobioides grandoculis***, sp. nov.

*Plate 6, figure 2.*

Type No. 65975, U. S. N. M.,  $1\frac{7}{8}$  inches long, Arhuo Atoll, Marshall Islands.

Body elongate, slender, with minute scales; dorsal 58, inserted at a distance from tip of snout equal to about  $\frac{1}{3}$  base of dorsal, its rays somewhat produced beyond membrane; anal 38, inserted at a distance from tip of lower jaw equal to about  $\frac{1}{3}$  base of anal; ventrals I, 5; caudal with middle rays somewhat produced. Mouth somewhat oblique, lower jaw projecting, lip thick and fleshy; teeth in bands in both jaws, the upper with two canine-like teeth anteriorly, one on each side; outer series of lower jaw enlarged, growing progressively shorter posteriorly; apparently fine teeth on vomer and palatines; gill membranes broadly joined to the isthmus; head 7.5 in length to base of caudal; depth 13.23; eye 4.25.

Color pale straw, fins colorless excepting the caudal which is slightly dusky at the tips of rays. Probably a young fish.

**CALLIONYMIDAE.*****Callionymus cookii* GÜNTHER.**

Proc. Zool. Soc. Lond., 1871, p. 665. Fische der Südsee, 1877, 6, p. 192, taf. 113, fig. B.

Two specimens, No. 05939, M. C. Z. 29596 (1 specimen),  $1\frac{5}{8}$  and  $2\frac{1}{4}$  inches long from Fakarava, Paumotu Islands.

The  $2\frac{1}{4}$  inch specimen is apparently a male, the other a female. Dorsal IV, 8; anal 7.

These specimens agree more closely with *Callionymus cookii* than with any other described species. The colors are faded, but in the male there are traces

of cross bars on the body and tail as well as small ocelli; dorsals and pectorals show traces of spots; ventrals plain; anal with dusky punctulations; first dorsal spine not produced, but last rays of second dorsal and middle rays of caudal produced. In the female the colors are similar to the above, but with what appears to have been a white-edged black blotch on spinous dorsal; the rays are now detached and this mark is not definite; second dorsal and caudal not so much produced. Neither specimen shows traces of spots on anal.

### BLENNIDAE.

#### *Enneapterygius atriceps* (JENKINS).

*Tripterygion atriceps* JENKINS, Bull. U. S. Fish. Comm., 1903, **22**, p. 505, fig. 46.

One specimen slightly over one inch long from Ponapi, Caroline Islands.

This specimen agrees so closely with the type specimens of *E. atriceps*, with which it has been compared, that we identify it as that species, although it differs somewhat in the vertical fin counts. Head 3.3; eye 3.25; dorsal III–XIII–10; A. I, 17; scales 32 or 33. The coloration is the same as in the type.

#### *Hypseurochilus vaillanti* JORDAN & SEALE.

Bull. U. S. Bur. Fish., 1906, **25**, p. 420.

One specimen, M. C. Z. 29377,  $\frac{23}{50}$  inch long from Lagoon at Fakarava, Paumotu Islands.

One specimen,  $1\frac{3}{10}$  inches long from Ponapi, Caroline Islands.

An examination of the type, No. 51788, U. S. N. M., from Pago Pago, Samoa, shows that it has the dorsal XII, 18 (not XII, 15, as given in description by Jordan & Seale), and the anal 19 (not 17). Our specimens agree with this, except that there appear to be 20 anal rays in the smaller specimen.

#### *Alticus periophthalmus* (CUVIER & VALENCIENNES).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 422.

*Salaria periophthalmus* CUV. & VAL., Hist. Nat. Poiss., 1836, **11**, p. 230 (311), pl. 328. GÜNTHER, *Fische der Südsee*, 1877, **6**, p. 207, taf. 114, figs. D, E. DAY, *Fishes of India*, 1876, p. 333, pl. 69, fig. 5.

No. 05906, a specimen  $2\frac{3}{8}$  inches long from Makemo, Paumotu Islands.

***Alticus caudolineatus* GÜNTHER.**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 423.

*Salarias caudolineatus* GÜNTHER, Fische der Südsee, 1877, **6**, p. 209, taf. 116, fig. F.

No. 05909, M. C. Z. 29583 ( 1 specimen), 2 specimens 2 and  $1\frac{3}{4}$  inches long (poor condition) from Rangiroa, Paumotu Islands.

Dorsal XII, I, 20; anal 21; simple supraorbital tentacle, and a bifid nasal tentacle. Our specimens do not agree exactly in the above characters with Günther's description.

***Salarias lineatus* CUVIER & VALENCIENNES.**

Hist. Nat. Poiss., 1836, **11**, p. 232 (314). DAY, Fishes of India, 1876, p. 332, pl. 70, fig. 8. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 426.

One specimen, No. 08915, M. C. Z. 29370,  $2\frac{3}{4}$  inches long from Arhno Atoll, Marshall Islands.

Head 5 in body; depth 5; eye 3.42 in head; dorsal XII (I), 23; anal 25; no crest.

Moderately slender, head bluntly rounded, profile steep, a short fringed nasal cirrus; a supraocular cirrus is sharply triangular and fringed on both sides.

Color in alcohol: ground color on top of head and back light brownish gray, faintly mottled with darker and lighter on back; about 3 rows of small black longitudinal spots beginning on a line under posterior 4th of dorsal and extending on body to base of caudal; caudal irregularly blotched with dark brown, but with a sharply defined narrow dark brown band running from the middle of the upper margin obliquely downward and backward; longitudinal light streaks on side, making broken lines, these being less broken farther down on the side, showing faintly near base of anal; sides with about 12 pairs of purplish brown cross bars somewhat triangular in shape with a wide angle, apex forward; color most intense on axis of body but continuing faintly toward dorsal and anal; 4 or 5 faint light bars across cheeks; 2 dark bars across base of pectoral; dorsals finely punctate, a brownish margin on soft dorsal anteriorly, a row of very faint dark spots on base of soft dorsal, arranged in pairs posteriorly; anal plain, pale, with a few fine punctulations on the upper margins of membranes and rays anteriorly.



Three other specimens, number 05899,  $2\frac{1}{2}$  to  $3\frac{1}{4}$  inches long from Fakarava, Paumotu Islands.

One of these specimens,  $3\frac{1}{4}$  inches long, has head 4.85 in body; depth 5.23; eye 4 in head; dorsal XII (I), 24; anal 24; crest on head, dorsal higher than the dorsal of another specimen  $2\frac{7}{8}$  inches long, which has head 4.59; depth 5.16; eye 3.85; dorsal XIII, 24; anal 24; no crest on head.

Color of specimen  $2\frac{7}{8}$  inches long without crest; comparing this specimen with 08915 it is much darker in color being light brown, abdomen abruptly white, same markings on body but not so dusky on tail, and lacking the oblique black bar; throat and chin dusky; spots at base of soft dorsal more distinct, and paired cross bars less distinct; spinous dorsal similar to body; traces of oblique light lines on soft dorsal as in *S. rivulatus*.

The  $3\frac{1}{4}$  inch specimen with crest and body more elongate has the color generally darker, body markings less distinct than the specimen,  $2\frac{7}{8}$  inches long without crest; light bars on soft dorsal a little more distinct; a narrow dusky margin on soft dorsal, with a narrow border of white; anal plain light brownish with dusky margin, at least in front; caudal same as body with a darker upper and lower margin and central rays, most intense at base, rays tipped with white.

***Salarias edentulus* (BLOCH & SCHNEIDER).**

GÜNTHER, *Fische der Südsee*, 1877, 6, p. 206, taf. 117, fig. A. JORDAN & SEALE, *Bull. U. S. Bur. Fish.*, 1906, 25, p. 429.

*Blennius edentulus* BLOCH & SCHNEIDER, *Syst. Ichth.*, 1801, p. 172.

*Salarias rivulatus* RÜPPELL, *Atlas*, 1828, p. 114. JORDAN & SEALE, *loc. cit.*, p. 429.

*Salarias quadricornis* DAY, *Fishes of India*, 1876, p. 331, pl. 70, fig. 4.

The collection contains the following female specimens from the Paumotu Islands: Nos. 05903,  $3\frac{7}{8}$  inches long from Makemo; 05898,  $3\frac{3}{8}$  inches long from Fakarava; 05907, 3 inches and 08936, M. C. Z. 29527,  $2\frac{1}{8}$  inches long from Rangiroa.

The last specimen has dorsal XII, 21; anal 23, and agrees in color with current descriptions of the species, except that on the caudal the spots are more or less coalescent, forming 3 wavy, broken cross bars. It differs from the description given by Jordan & Richardson in *Fishes from Islands of the Philip-*

pine Archipelago (Bull. U. S. Bur. Fish., 27, p. 284), in having one more anal ray.

The following male specimens are in the collection (formerly called *rivulatus*), Nos. 05900,  $3\frac{3}{8}$  inches and 05904, three specimens  $2\frac{1}{8}$  to  $5\frac{1}{8}$  inches from Makemo, Paumotu Islands.

The last three specimens each have dorsal XIII, 20; anal 24. Nos. 05911, M. C. Z. 29516, four specimens 2 to  $2\frac{1}{4}$  inches long from Makemo, and 05901, M. C. Z. 29382,  $4\frac{2}{3}$  inches long from Rangiroa, Paumotu Islands.

The largest specimen among No. 05904 gives the following: head 4.41 in body; depth 4.07; eye 4.36 in head; longest dorsal spine 1.41; longest ray 1.25; longest anal ray 1.60; dorsal XII, 20; anal 22. Soft dorsal attached to caudal for about  $\frac{2}{3}$  of its length; caudal slightly rounded; front of head almost perpendicular; slightly rounded; crest present; supraorbital tentacle bifid; a single row of cardiform teeth in each jaw; no canines present, anterior nostril with short tube having a fringe of cirri on its posterior border.

In spirits this specimen is much lighter than the other specimens though similarly but more faintly marked on body; soft dorsal dusky in front, lighter behind, showing very slight traces of the lighter bars. The fin is also very light colored with a broad dusky margin showing slight traces of oblique bars; anal light colored, also showing slight traces of bars and with narrow dusky margin on membrane; caudal has a broad faintly dusky margin and faint dusky bar about middle.

The differences formerly separating *S. edentulus* and *S. rivulatus* were the presence of an occipital crest in *S. rivulatus*, and differences in coloration. These are, however, merely sexual characters. In the fishes of Samoa Jordan & Seale record seventy-five specimens of *S. rivulatus* and sixty of *S. edentulus* from Apia and Pago Pago. An examination of thirty-seven of these shows that of twenty-four specimens identified as *S. rivulatus* all but one of the mature specimens are males, and this one lacked the crest and had the coloration of the *S. edentulus* form. Of the thirteen specimens identified as *S. edentulus* all were females except one, and this one had a crest and the coloration of the *S. rivulatus* form. All of our specimens show the same differences and leave no doubt but that the two species are identical.

**Petroscirtes mitratus** RÜPPELL.

Atlas, 1828, p. 111, taf. 28, fig. 1.

Nos. 08908, M. C. Z. 29522, three specimens each  $1\frac{1}{2}$  inches, and 09086, four specimens  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inches long, from Moen, Truk Group, Caroline Islands.

**Petroscirtes quadrimaculatus**, sp. nov.

*Plate 7, figure 1.*

The collection contains two specimens, No. 09069,  $1\frac{5}{8}$  and  $1\frac{7}{8}$  inches long from Arhno Atoll, Marshall Islands, the larger of which is the type, and one specimen, M. C. Z. 29393, 1.75 inches long from Papeete, Tahiti, Society Islands. The type No. 65980, U. S. N. M., gives the following measurements:—

Head 4.25 in body length; depth 6.07; eye 3.33 in head; snout 3.33; head rather sharply conical; posterior nostril with a slightly raised membranous edge, anterior nostril with short tubes; two rows of narrow, close-set, rounded incisors in upper jaw, those of inner row larger, no teeth visible on vomer or palatines; one row of larger incisors in the front of the truncate lower jaw, and a huge backward curved, fang-like canine tooth in the anterior angle of each side of lower jaw, the lower incisors horizontal; caudal truncate; dorsal 41; anal 29.

Color: back, upper side of body and top of head light brown; a series of large quadrate dark brown spots, separated by narrow interspaces, from back of eye to base of caudal, below which an abruptly narrow silvery stripe extending from tip of lower jaw and lower border of eye to base of caudal; the surface below this band plain whitish. The narrow interspaces between the spots on body are made up of pairs of light colored lines diverging at top and extending to base of dorsal, darker between, but not so dark as the quadrate spots, and causing spots to show faintly as if continuous to the dorsal; very narrow light colored bars extending below from the middle, or a little in front of middle, to the anal; the second interspace behind the pectoral continues in this way.

Dorsal and anal are crossed by broad bars, parallel with the rays, corresponding to the quadrate spots in position, the broad bars covering about .8 of width of fin; above these a narrow whitish stripe with a very narrow blackish border, tips of rays white; the borders not showing on anal, but tips of rays also white; pectoral, ventral, and caudal pale.

In the cotype, the ground color similar to type but instead of spots there are about the same number of cross bars on the body and extending across entire side, narrower at base of dorsal, than at base of anal, most distinct in middle line of body, extending across anal and to middle of dorsal; rest of dorsal as in type; anal without light border and other fins as in type. A light spot in center of each of the broad dark bars on body appearing as an intensification of the longitudinal silvery stripe of the type; the narrowing of the bars on back due to the diverging of the pairs of lines that make up the interspaces, and the light bars across the lower part of the body continuous with these interspaces and not as in the type.

In the specimen from Papeete the color on body is similar to the type, except that the light bars across the lower portion are continuous with the interspaces and the bars of both dorsal and anal continue entirely across dorsal and anal with no marginal stripes.

#### FIERASFERIDAE.

##### *Fierasfer parvipinnis* KAUP.

Apodes, 1850, p. 160, pl. 16, fig. 2. GÜNTHER, Cat., 1862, 4, p. 383, after KAUP. *Fische der Südsee* 1909, 8, p. 338. FOWLER, Proc. Acad. Nat. Sci. Phila., 1900, p. 528.

*Jordanicus parvipinnis* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 435.

No. 05926, a specimen  $7\frac{3}{8}$  inches long from Papeete, Tahiti, Society Islands.

#### ECHENEIDIDAE.

##### *Echeneis naucrates* LINNÉ.

Syst. Nat. ed. 10, 1758, p. 261. DAY, Fishes of India, 1876, p. 257, pl. 57, fig. 1.

*Lepidocheneis naucrates* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 411.

Two specimens from Paumotu Islands, one, Nos. A44, M. C. Z. 29725,  $13\frac{3}{4}$  inches long from Fakarava and A59,  $18\frac{1}{2}$  inches long from Makemo. One specimen, No. A157, 20 inches long from Funafuti, Ellice Islands.

No. A157 has dorsal XXIV, 38; anal 34, color brown, lighter above and below, no trace of a lateral stripe, except on head, where it is very distinct, disappearing on base of pectoral; ends of pectoral rays pale; dorsal and anal uni-

form light brown; tips of dorsal rays dusky; outer rays of caudal not pale; caudal irregular, shallow emarginate.

No. A59 has dorsal XXIV, 33; anal 31, color dark brown on back, a distinct lateral stripe, with a distinct white stripe above and below this stripe; pectoral blue black, lacking white tips; caudal deeply lunate with pale outer rays.

No. A44, dorsal XXIII, 34; anal 32; color, dark brown above, with a darker brown lateral stripe, lighter below, but not so light above as in A59; ends of lower rays of pectoral pale; dorsal and anal yellowish brown, each with a darker brownish marginal band, with pale tip to the rays; outer caudal rays pale, middle rays longest and very dark, making the fin double truncate.

### **Echeneis remora** LANNÉ.

Syst. Nat. ed. 10, 1758, p. 260. DAY, Fishes of India, 1876, p. 258.

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 494.

No. 05940, four specimens,  $3\frac{1}{4}$  to  $6\frac{1}{4}$  inches long from Surface at Station AA11, Sept. 3, 1899.

No. 05942, M. C. Z. 29466, two specimens,  $3\frac{1}{2}$  and  $3\frac{3}{4}$  inches long from Society Islands.

No. 05941, four specimens,  $3\frac{1}{8}$  to  $9\frac{1}{2}$  inches long from Fakarava, Paumotu Islands.

### **PLEURONECTIDAE.**

#### **Platophrys mancus** (BROUSSONET).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 412.

*Pleuronectes mancus* BROUSSONET, Ichth. sist. Piscium, 1782, pl. 3, 4.

No. A178, a specimen,  $9\frac{1}{4}$  inches long from Arhno, Marshall Islands. Dorsal 99; anal 77; pectoral equals head.

No. A43, M. C. Z. 29720, a specimen  $8\frac{3}{4}$  inches long from Fakarava, Paumotu Islands. Dorsal 100; anal 79; pectoral slightly shorter than head.

No. A69, a specimen  $7\frac{3}{8}$  inches long from Makemo, Paumotu Islands. Dorsal 100; anal 80; pectoral reaches edge of preopercle.

No. 05945, M. C. Z. 29512, a specimen  $1\frac{5}{8}$  inches long from Fakarava, Paumotu Islands.

**Platophrys pantherinus** (RÜPPELL).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 512.

*Rhombus pantherinus* RÜPPELL, Atlas, 1828, p. 121, pl. 31, fig. 1.

*Rhomboidichthys pantherinus* GÜNTHER, Fische der Südsee, 1909, **8**, p. 342.

No. A132,  $9\frac{1}{2}$  inches long from Kambara, Fiji Islands. Three specimens from the following places in Paumotu Islands: Nos. A42, M. C. Z. 29735, 09008, M. C. Z. 29474, 7 and  $1\frac{5}{8}$  inches long from Fakarava and 05832, 5 inches long from Makemo.

No. 09012,  $3\frac{5}{8}$  inches long from Guam. Nos. 09056 and 09097,  $1\frac{1}{2}$  and  $3\frac{1}{2}$  inches long from Moen, Truk Group, Caroline Islands. No. 10060,  $1\frac{1}{4}$  inches long from Papeete, Tahiti, Society Islands. No. 09002, M. C. Z. 29535,  $5\frac{1}{2}$  inches long from Namuka, Tonga Islands.

In No. A42, dorsal 91, anal 69; the pectoral not reaching edge of preopercle and is 1.5 in head; eye equals distance between interorbital rims.

In specimen A132, pectoral does not reach caudal, but is nearly twice as long as head; dorsal 91; anal 67. These specimens of *P. pantherinus* have a much larger eye than *P. mancus* has, the upper eye being 4.33 in head, it about equals the distance between the orbital rims; in *P. mancus* the eye is 5.5 in head and about half the distance between the orbital rims.

**SOLEIDAE.****Pardachirus pavoninus** (LACÉPÈDE).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 413.

*Achirus pavoninus* LAC. Hist. Nat. Poiss., 1802, **4**, p. 658, 660, 661. DAY, Fishes of India, 1877, p. 427, pl. 93, fig. 2.

No. 08937, a specimen  $2\frac{5}{8}$  inches long from Tonga Islands.

It is said of this species that only the scales on the head and anterior part of body are ciliated, but in the specimen No. 08937 all the scales on both sides of the body are ciliated.

**BALISTIDAE.****Balistes vidua** SOLANDER.

Zool. Voy. Sulphur. Ichth., 1845, p. 128, pl. 59, figs. 9, 10. JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 409, pl. 61. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 361.  
*Melichthys vidua* BLEEKER, Atlas Ichth., 1865, **5**, p. 107, 109, tab. 217, Balist., 3, fig. 2.

Nos. A29,  $7\frac{7}{8}$  inches and A30, M. C. Z. 29766,  $6\frac{3}{8}$  inches long from Tahiti, Society Islands.

**Balistes capistratus** SHAW.

Gen. Zool., 1804, **5**, p. 417 (after Lacépède). JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 411, fig. 181.

*Balistes (Balistapus) frenatus*, BLEEKER, Atlas Ichth., 1865, **5**, p. 110, 114, tab. 223, Balist., 9, fig. 2.

Nos. A70,  $11\frac{1}{2}$  inches and A89, M. C. Z. 29740,  $10\frac{1}{2}$  inches long, from Makemo, Paumotu Islands.

**Balistes niger** BONNATERRE.

Ichthyologie, 1788, p. 19, pl. 85, fig. 352.

*Balistes (Balistapus) conspicillum* BLEEKER, Atlas Ichth., 1865, **5**, p. 114, 116, tab. 221, Balist., 7, fig. 2.

*Balistes conspicillum* GÜNTHER, Cat., 1870, **8**, p. 220.

*Balistes niger* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 362.

No. A195, a specimen, 10 inches long from Jaluit, Marshall Islands.

**Balistapus aculeatus** (LINNÉ).

JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, **23**, pt. 1, p. 414, pl. 62. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 362.

*Balistes aculeatus* LINNÉ, Syst. Nat. ed. 10, 1758, p. 328.

Nos. A199, M. C. Z. 29791,  $5\frac{5}{8}$  inches, and 08950,  $4\frac{1}{8}$  inches long from Kusaie, Caroline Islands. Nos. 05928 to 05930, four specimens,  $4\frac{1}{4}$  to 7 inches long from Rangiroa, Paumotu Islands. No. 08849, two specimens, M. C. Z. 29457,  $1\frac{3}{4}$  and  $4\frac{3}{4}$  inches long from Funafuti, Ellice Islands.

**Balistapus undulatus** (MUNGO PARK).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 363.

*Balistes undulatus* MUNGO PARK, Trans. Linn. Soc., 1797, **3**, p. 37.

The collection contains from Marshall Islands, Nos. A187,  $9\frac{3}{4}$  inches and

A188, M. C. Z. 29773, 6 inches long, from Jaluit, and A180, M. C. Z. 29767, from Arhno; and 08874, from Suva, Fiji Islands.

### OSTRACIIDAE.

#### *Ostracion cornutus* LINNÉ.

Syst. Nat. ed. 10, 1758, p. 331. DAY, Fishes of India, 1878, p. 697, pl. 176, fig. 4.

*Ostracion* (*Acanthostracion*) *arcus* BLEEKER, Atlas Ichth., 1865, 5, p. 31, 35, tab. 202, Ostrac. 2, fig. 3, and 204, Ostrac. 4, fig. 4.

*Lactoria cornuta* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 368.

No. A116, a specimen  $10\frac{1}{2}$  inches long from Tongatābu, Tonga Islands.

#### *Ostracion nasus* BLOCH.

Aust. Fische, 1787, 1, p. 121 (118), taf. 138. GÜNTHER, Cat., 1870, 8, p. 263. DAY, Fishes of India, 1878, p. 696.

?*Ostracion tuberculatum* JORDAN & SEALE, Bull. U. S. Bur. Fish., 1907, 26, p. 35.

One specimen, No. 09092, one inch long from Moen, Truk Group, Caroline Islands. One specimen M. C. Z. 29600,  $\frac{43}{100}$  inches long from Suva, Fiji Islands.

The specimens agree closely with *O. tuberculatum* as described by Jordan & Seale, Günther, and Day (*loc. cit.*).

According to Günther, *O. cubicus*, which he considers synonymous with *O. tuberculatus*, Cat., 8, p. 260, has the back slightly convex without raised ridge in the median line. According to Day — *loc. cit.*, in *O. nasus* the width of the body is greater than the height, and in *O. cubicus* the width about equals the height. In this character our specimens agree with *O. nasus*.

### TETRAODONTIDAE.

#### *Spheroides hypselogeneion* (BLEEKER).

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 368.

*Tetraodon hypselogeneion* BLEEKER, Nat. Tijds. Ned. Ind., 1852, 3, p. 300. BLEEKER, Atlas Ichth., 1865, 5, p. 60, 61, tab. 218, Gymnod. 9, fig. 5.

No. 08837, three specimens 3 to  $3\frac{1}{8}$  inches long from Funafuti, Ellice Islands. M. C. Z. 29429 (1 specimen).



These specimens are badly faded and show no dark bars across the cheek, but they agree very well with Rüppell's plate of *T. honckenji* (Atlas, 1828, pl. 17, fig. 2).

***Tetraodon lacrymatus* CUVIER.**

QUOY & GAIMARD, Voy. Uranie, Zool., 1824, p. 204. JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, 23, pt. 1, p. 429, fig. 186.

The collection contains Nos. A37, M. C. Z. 29776, a specimen  $7\frac{1}{4}$  inches long from Tikei; A55,  $5\frac{3}{8}$  inches, Fakarava, and A63,  $8\frac{3}{4}$  inches long from Makemo, all in the Paumotu Islands.

***Tetraodon manillensis* PROCÉ.**

Bull. Philom., 1822, p. 130.

*Cragracion manillensis* BLEEKER, Atlas Ichth., 1865, 5, p. 66, 69, tab. 208, Gymnod. 4, fig. 2.

*Tetraodon immaculatus* var. *virgatus* GÜNTHER, Cat., 1870, 8, p. 292. JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, 25, p. 370.

Nos. A150,  $11\frac{1}{2}$  inches and A139, M. C. Z. 29789,  $5\frac{1}{8}$  inches long from Suva, Fiji Islands, and 09061,  $\frac{4}{5}$  inches long from Arhno Atoll, Marshall Islands.

Color of back, in A150, dark brown, growing lighter downward, becoming white on a level with lower part of pectoral; about 11 narrow black longitudinal stripes between the dorsal and anal with an occasional incomplete line, the complete lines extending nearly to the caudal, especially those above; there are similar, but lighter lines on the belly, extending from the throat to the region of the anal; the lines on body extending on to head, three or four of them encircling the pectoral fin; outer rays of caudal black. In the smaller example (A139) the dark lines not evident on the belly; the prickles on the smaller one proportionately longer.

Jordan & Seale say: "Apparently Dr. Günther is right in regarding *T. manillensis*, with the back streaked, as the young of *T. immaculatus* in which species the back is plain in life. Specimens before us from Negros in the Philippines show that the black stripe on the back disappears with age. Both Günther and Bleeker record specimens of the striped forms of *T. manillensis*, of 10 to 12 inches in length." Since the black stripes are present as shown by Günther & Bleeker, and by our specimens in individuals of 10 or 12 inches in length, and as the striped form is of such wide distribution, the presence of stripes is not a

character peculiar to the young, and if a constant color character is of any specific value this should be considered a distinct species and not the young of *T. immaculatus*. The disappearing black stripe on Jordan & Seale's Negros specimens may be due to the action of the preservative rather than to age.

***Canthigaster solandri* (RICHARDSON).**

JORDAN & SEALE, Bull. U. S. Bur. Fish., 1906, **25**, p. 371.

*Tetraodon solandri* RICHARDSON, Zool. Voy. Sulphur. Ichth., 1845, pl. 125, pl. 57, fig. 4-6.

Nos. 05933, a specimen 3 inches long from Bora Bora, Society Islands, and 05823, M. C. Z. 29487, a specimen  $2\frac{3}{8}$  inches long from Makemo, Paumotu Islands.

These specimens are badly faded, but they agree very well with a specimen from Samoa identified by Jordan & Seale, and with the descriptions of *C. solandri*.

***Canthigaster constellatus*, sp. nov.**

*Plate 7, figure 2.*

Type No. 65767 U. S. N. M., 2 inches long; cotype No. 29396, M. C. Z.

No. 05922, nine specimens  $1\frac{3}{8}$  to 2 inches long from Fakarava, Paumotu Islands. These specimens are immature and faded and therefore difficult of identification. But, so far as the color can be determined, they agree with the figure of *Tetrodon ocellatus* Bennett in Fishes of Ceylon, pl. 21, in having apparently the same sort of subdorsal ocellus and the same sort of lines about the eye and snout and back, especially between the dorsal and caudal; the longitudinal row of blue spots in Bennett's figure is indicated by a similar row of white spots in the present specimens; our specimens show in addition irregular dusky blotches, sometimes coalescing, forming a sort of band, sometimes barely visible, extending from just above the gill opening to caudal; the lower edge of these dark blotches sharply define the white ventral portion of the fish; in one or two of our specimens the largest blotch, which is situated just anterior to a vertical line from the subdorsal ocellus, extends a short distance on the side of the belly as a faint dusky bar and upward toward the back; in several there are faint traces of three blotches between the snout and the pectoral, the first situated some distance back of the angle of the mouth, the second below the

anterior margin of the eye, the third below the posterior margin; in one or two specimens there is also a faint blotch-like band across the back, just back of the highest part of the back or hump.

These additional colors may be characters of the young and can hardly be considered of specific value; the close agreement with Bennett's figure would perhaps justify its identification with that species notwithstanding the remoteness of the two localities; however, Bleeker has described a species under the name of *C. bennetti* which he considers identical with Bennett's *C. ocellatus*. In his Atlas, 5, Bleeker restores *C. ocellatus* Bennett, and figures it (Tab. 214, Gymnod. Tab. 10, fig. 5), but this figure is apparently of a quite different species from Bennett's *C. ocellatus*.

Inasmuch as Bennett's name, *ocellatus*, is preoccupied by Bloch, our specimens, even should they prove identical with Bennett's, would require a new name.

Head 2.5 in length; eye 4 in head; snout 1.68; interorbital about 8; dorsal 10; anal 9; body covered with fine prickles.

#### DIODONTIDAE.

##### *Diodon hystrix* LANNÉ.

Syst. Nat. ed. 10, 1758, p. 335. JORDAN & EVERMANN, Bull. U. S. Fish. Comm., 1905, 23, pt. 1, p. 437, fig. 192.

No. A31, a specimen  $11\frac{3}{4}$  inches long, from Papeete, Tahiti, Society Islands.

#### ANTENNARIIDAE.

##### *Antennarius bigibbus* (LACÉPÈDE).

BLEEKER, Atlas Ichth., 1865, 5, p. 10, 21, pl. 199, fig. 3.

GÜNTHER, Fische der Südsee, 1876, 5, p. 165, taf. 105, fig. B.

*Lophius bigibbus* LAC., Hist. Nat. Poiss., 1798, 1, p. 325.

No. 05944, a specimen  $2\frac{1}{4}$  inches long from Fakarava, Paumotu Islands.

## DISTRIBUTION OF THE SPECIES.

	Guam	Caroline Islands	Marshall Islands	Ratak Chain	Gilbert Islands	Ellice Islands	Fiji Islands	Tonga Islands	Cook Islands	Society Islands	Paumotu Islands	Marquesas Islands	Open Pacific
<i>Carcharias melanopterus</i> . . . . .											+		
<i>Albula vulpes</i> . . . . .						+							
<i>Chanos chanos</i> . . . . .												+	
<i>Stolephorus delicatulus</i> . . . . .			+		+						+		
<i>Harengula kunzei</i> . . . . .			+				+						
<i>sundaica</i> . . . . .													+
<i>commersoni</i> . . . . .							+	+		+			
<i>Saurida gracilis</i> . . . . .		+											
<i>Anguilla mauritiana</i> . . . . .		+									+		
<i>otaheitensis</i> . . . . .										+			
<i>Muraenichthys macropterus</i> . . . . .			+										
<i>schultzei</i> . . . . .						+							
<i>Leiuranus semieinctus</i> . . . . .			+										
<i>Gymnothorax richardsonii</i> . . . . .										+			
<i>pietius</i> . . . . .			+			+					+		
<i>rupelliae</i> . . . . .											+		
<i>tessellatus</i> . . . . .											+		
<i>stellatus</i> . . . . .											+		
<i>Echidna tritor</i> . . . . .											+		
<i>Enehelynassa canina</i> . . . . .											+		
<i>Uropterygius pantherinus</i> . . . . .											+		
<i>marmoratus</i> . . . . .											+		
<i>concolor</i> . . . . .											+		
<i>Belone platyura</i> . . . . .								+					
<i>Hemiramphus dussumieri</i> . . . . .	+	+	+		+		+	+			+		
<i>affinis</i> . . . . .		+	+		+								
<i>far</i> . . . . .								+					
<i>Zenarchopterus dispar</i> . . . . .	+	+					+						
<i>Exocoetus volitans</i> . . . . .													
<i>Cypsilurus speculiger</i> . . . . .	+												+
<i>bahiensis</i> . . . . .			+										
<i>Atherina lacunosa</i> . . . . .		+	+										
<i>endraechtensis</i> . . . . .		+	+	+			+				+		
<i>vaigiensis</i> . . . . .		+	+								+		
<i>uisila</i> . . . . .			+		+								
<i>Liza caeruleomaculata</i> . . . . .	+	+					+	+					
<i>Liza melanoptera</i> . . . . .							+	+					
<i>Liza trocheli</i> . . . . .	+	+	+			+	+	+	+	+	+		
<i>vaigiensis</i> . . . . .	+	+	+			+	+	+			+		



## DISTRIBUTION OF THE SPECIES—Continued.

[illegible]

## DISTRIBUTION OF THE SPECIES—Continued.

	Guam	Caroline Islands	Marshall Islands	Ratak Chain	Gilbert Islands	Ellice Islands	Fiji Islands	Tonga Islands	Cook Islands	Society Islands	Pannotu Islands	Marquesas Islands	Open Pacific
<i>Abudefduf curacao</i> . . . . .			+										
<i>sexfasciatus</i> . . . . .										+	+		
<i>Dascyllus aruanus</i> . . . . .			+							+	+		
<i>trimaculatus</i> . . . . .			+				+						
<i>pomacentroides</i> . . . . .					+								
<i>Chromis caeruleus</i> . . . . .		+			+						+		
<i>Stethojulis strigiventer</i> . . . . .		+	+								+		
<i>casturi</i> . . . . .			+										
<i>bandanensis</i> . . . . .			+			+							
<i>Halichoeres trimaculatus</i> . . . . .											+		
<i>Julis pulcherrima</i> . . . . .							+						
<i>Thalassoma lunare</i> . . . . .			+										
<i>purpureum</i> . . . . .											+		
<i>Cheilinus digrammus</i> . . . . .		+			+								
<i>undulatus</i> . . . . .		+			+		+				+		
<i>Cymolutes prateatus</i> . . . . .								+					
<i>Scarichthys caeruleopunctatus</i> . . . . .								+					
<i>Scarus brunneus</i> . . . . .			+				+						
<i>pulchellus</i> . . . . .											+		
<i>bataviensis</i> . . . . .			+										
<i>Platax orbicularis</i> . . . . .										+			
<i>Forcipiger longirostris</i> . . . . .											+		
<i>Megaprotodon trifascialis</i> . . . . .											+		
<i>Chaetodon setifer</i> . . . . .		+			+						+		
<i>ulietensis</i> . . . . .											+		
<i>lunula</i> . . . . .			+								+		
<i>kleinii</i> . . . . .			+								+		
<i>trifasciatus</i> . . . . .							+						
<i>Zanclus canescens</i> . . . . .			+			+							
<i>Teuthis nigricans</i> . . . . .							+						
<i>elongatus</i> . . . . .		+											
<i>triostegus</i> . . . . .			+								+		
<i>guttatus</i> . . . . .					+						+		
<i>mata</i> . . . . .											+		
<i>Ctenochaetus striatus</i> . . . . .										+			
<i>Zebrasoma rhombeum</i> . . . . .										+			
<i>veliferum</i> . . . . .										+			
<i>Acanthurus brevirostris</i> . . . . .											+		
<i>vlamingi</i> . . . . .											+		
<i>Siganus fuscescens</i> . . . . .		+											
<i>punctatus</i> . . . . .			+								+		
<i>rostratus</i> . . . . .							+						
<i>Sebastes scabra</i> . . . . .		+								+			
<i>Scorpaenopsis laotale</i> . . . . .											+		
<i>Sebastes gelatacme</i> . . . . .							+						







## EXPLANATION OF THE PLATES.

### PLATE 1.

*Trachinotus oblongus* Cuvier & Valenciennes. Page 272.

### PLATE 2.

Fig. 1. *Trachinotus bailloni* (Lacépède). Page 271.

Fig. 2. *Kuhlia malo* (Cuvier & Valenciennes). Page 280.

### PLATE 3.

Fig. 1. *Kuhlia maculatus* (Cuvier & Valenciennes). Page 281.

Fig. 2. *Kuhlia proxima* Kendall & Goldsborough. Page 282.

### PLATE 4.

Fig. 1. *Lutjanus marginatoides* Kendall & Goldsborough. Page 287.

Fig. 2. *Therapon maculatus* Kendall & Goldsborough. Page 288.

### PLATE 5.

Fig. 1. *Dascyllus pomacentroides* Kendall & Goldsborough. Page 298.

Fig. 2. *Forcipiger longirostris* Broussonet. Page 306.

### PLATE 6.

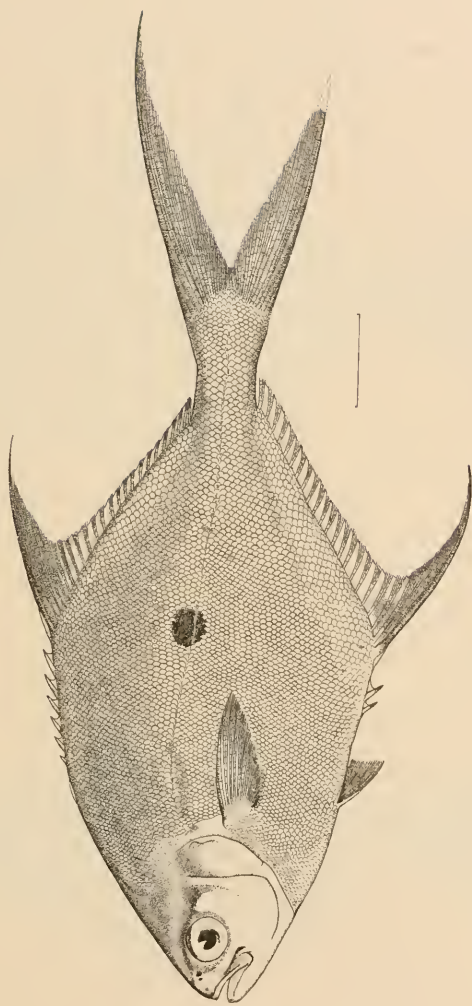
Fig. 1. *Ruppellia lacunicola* Kendall & Goldsborough. Page 318.

Fig. 2. *Paragobioides grandoculis* Kendall & Goldsborough. Page 324.

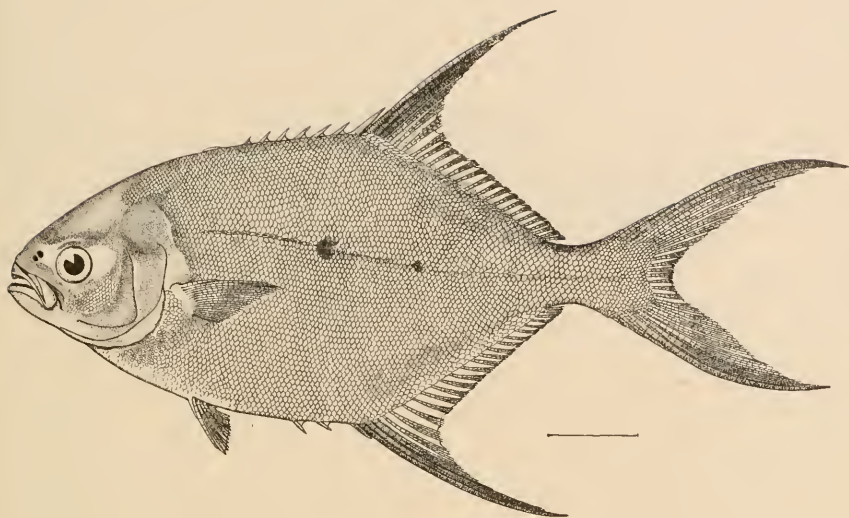
### PLATE 7.

Fig. 1. *Petrosciartes quadrimaculatus* Kendall & Goldsborough. Page 329.

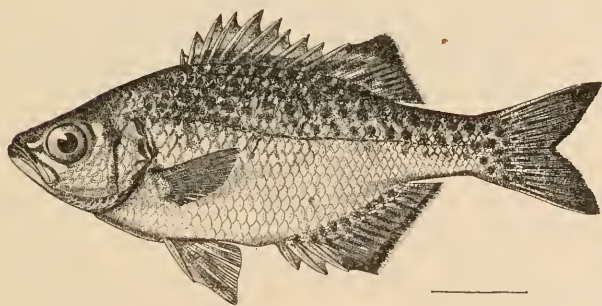
Fig. 2. *Canthigaster constellatus* Kendall & Goldsborough. Page 336.





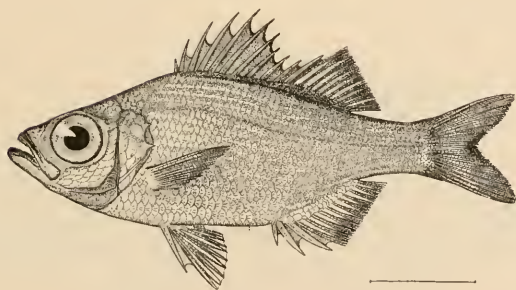
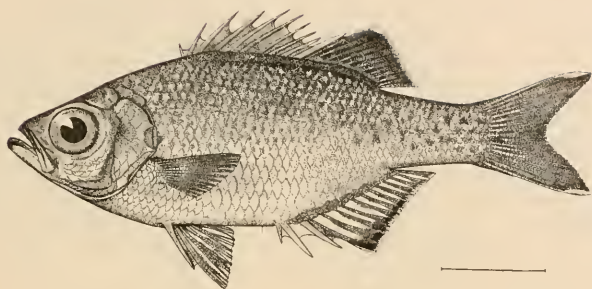


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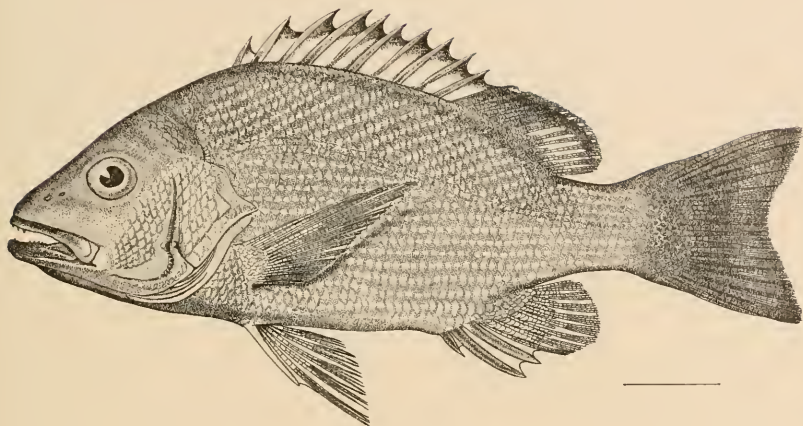
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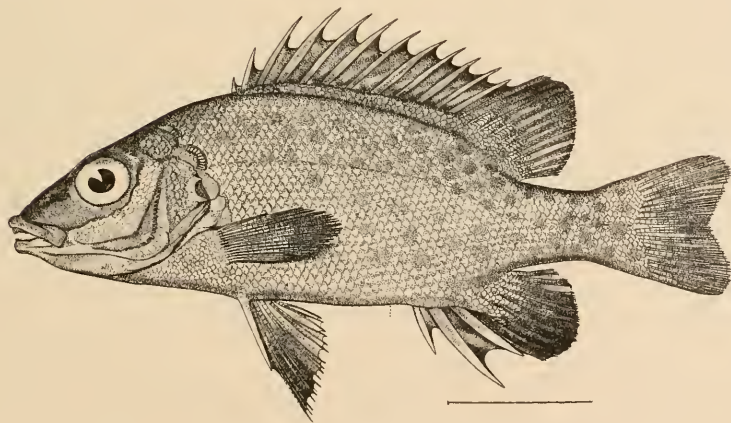






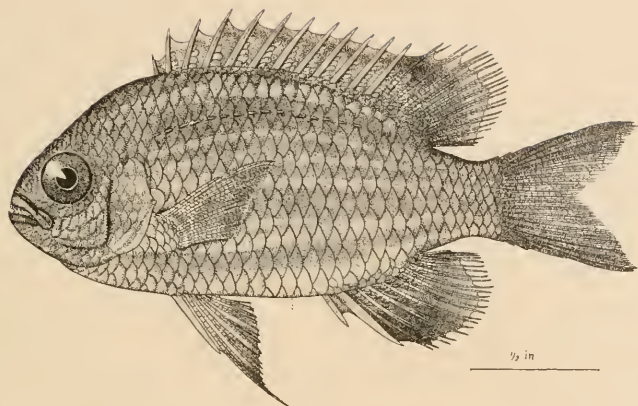


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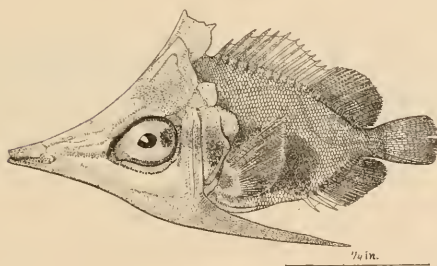


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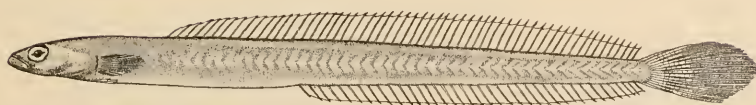
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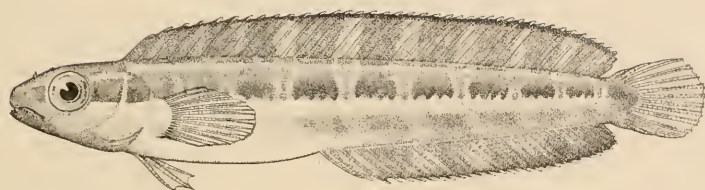


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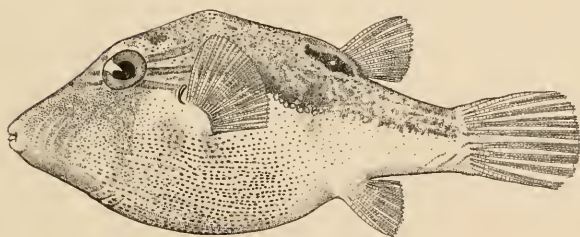
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*A price list of the publications of the Museum will be sent on application to the Curator of the Museum of Comparative Zoölogy, Cambridge, Mass.*

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- XXXV. H. LUDWIG. Asteroidea. Mem. M. C. Z., Vol. XXXII. July, 1905. 12, 292 pp. 35 Plates, 1 Chart.
- XXXVI. E. TROMAN. Ein Beitrag zur Morphologie des Tiefseefischgehirnes. Mem. M. C. Z., Vol. XXX. No. 3. October, 1906. 41 pp. 6 Plates.

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Vols. XLIII., LII., and LIII., of the BULLETIN, and Vols. XXV., XXVI., XXVII., XXX., XXXIV., XXXV., XXXVI., XXXVII., and XXXVIII. of the MEMOIRS, are now in course of publication.

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